symantec.

Norton
Ghost™ 9.0

User's Guide

Norton Ghost User's Guide

Contents

Chapter 4   Creating Backup Images

Chapter 5   Restoring Files and Folders

Chapter 6   Restoring Backup Images

Feature Summary

1

Norton Ghost is an advanced disaster recovery and backup solution for your PC. Wizards guide you through creating an exact copy–or backup image–of your hard drive.

Norton Ghost also makes it easy to copy everything from your hard drive to a new hard drive when you upgrade the hardware in your computer.

Backing up and restoring your computer

If you have a backup and you encounter problems with your computer, you can restore the backup image to return your computer to the state it was in when you created the backup. Instead of just getting some files back, you get the operating system, applications, and your data files from the drive. Having a good backup also lets you restore individual files and folders if necessary.

Using Norton Ghost protects you from the following problems:

- Poorly performing software
- Faulty Internet downloads
- Hard drive failure
- Files accidentally deleted or overwritten
- Corrupted files

What's new in Norton Ghost

Norton Ghost 9.0 includes the following new features:

Feature	Description
Incremental backups	Previous versions of Norton Ghost required you to back up an entire drive whenever you performed a backup. Norton Ghost 9.0 lets you create a base backup with incremental backups. A base backup (.v2i) is a full backup of everything on the drive. An incremental backup (.iv2i) is an "addendum" to the base backup that captures everything that changed on the drive since the base backup was created. Because they contain less data, incremental backups are faster to create and require less disk space to store, so you can back up your computer more frequently without using as much time and space.
Symantec Recovery Disk	A graphical, secondary boot environment (or operating system) that gives you the minimal functionality needed to access backup image files on a secondary hard drive on your local computer or on your network and restore them. This environment is typically used when a drive cannot be restored from within Windows or when the computer has suffered a catastrophic failure and you need to restore the entire hard drive. The recovery environment is available on the Norton Ghost CD or on the Symantec Recovery Disk CD (part of Norton SystemWorks Premier).

Feature	Description
Hot backups	Backup without interrupting your activities in Windows. No need to reboot to DOS even when backing up your operating system partition.
Tray icon	Ghost adds an icon to the Windows system tray. By default, the Ghost system tray icon appears in the lower-right corner of your computer monitor. Right-click this icon to open a menu containing frequently used Ghost features.
LiveUpdate	Use your Internet connection and LiveUpdate to obtain program updates for your computer. LiveUpdate updates all Symantec products on your computer.
Shrink on restore for FAT, FAT32, and NTFS	Smaller drives can be used when restoring backup images (when space is available).
Backup image compatibility	Take advantage of the new Norton Ghost 9.0 capabilities and backup image file format (.v2i) and still be able to access and restore backup images created by earlier versions of Drive Image (.pqi) and Norton Ghost (.gho).
Ability to save backups to USB and FireWire drives and to DVD	With Norton Ghost, you can save backups to USB and FireWire drives and to DVD—as well as to a local drive, network drive, or other removable media (such as CD-R, CD-R/W, Zip, or Jaz drives).

Feature	Description
Mount backup images	Mount a backup image as a drive letter that appears in Windows Explorer and My Computer for quick recovery of folders and files.
Operating system support	Norton Ghost 9.0 is supported on Windows XP/2000 operating systems. Symantec also includes Norton Ghost 2003 for customers who still use Windows 9x, Windows Me, or Windows NT 4.0 Workstation. For information about Norton Ghost 2003, see the product's online help, or refer to the Norton Ghost 2003 manuals, which are included on the Norton Ghost 2003 CD.

How does Norton Ghost work?

You do not have to choose individual files or folders to include in a backup image. Instead, you choose a drive to back up; Norton Ghost copies the contents of that drive into a file called a backup image.

You can save the backup image to a hard drive, a USB or FireWire drive, a network drive, or to removable media.

When you experience a problem with your computer or if you need to recover a file or folder for any reason, you can restore a file, folder, or an entire drive from your existing backups.

Installing Norton Ghost

2

Before installing Norton Ghost, please review the system requirements that are listed in this chapter.

System requirements

Your computer must meet the following minimum requirements:

Operating system	Windows 2000 Pro/XP Home/XP Pro Other operating systems are supported by Norton Ghost 2003. See "Support for older Windows versions" on page 12.
Processor	Pentium 233 MHz
RAM	128 MB for Norton Ghost running on Windows 2000/XP 256 MB for Symantec Recovery Disk
Hard drive free space	45 MB for program files and an additional 40 MB for the Microsoft .NET Framework if it is not already installed Storage space for your backup images, unless you choose to store them to a network or on removable media
CD or DVD drive	Any speed See a supported drives list at http://www.symantec.com
Software	Microsoft .NET Framework. During installation, you are prompted to install it if it is not already installed on the computer.

Supported file systems and removable media

Norton Ghost supports the listed file systems and removable media.

File Systems	Norton Ghost is supported on FAT16, FAT16X, FAT32, FAT32X, NTFS, dynamic disks, Linux Ext2, Linux Ext3, and Linux swap partitions.
Removable Media	Norton Ghost supports the saving of backup image files locally (that is, backup image files that are created and saved on the same computer where the console is installed) to most CD-R, CD-RW, DVD-R(W), and DVD+RW recorders on the market today. For an updated list of supported drivers, see a supported drives list at http://www.symantec.com.
	It also supports saving backup image files to most USB devices, 1394 FireWire devices, JAZ, Zip, SuperDisk, and magneto-optical devices.
	Norton Ghost does not support RAM drives.

Support for older Windows versions

Norton Ghost 9.0 does not run under Windows 9x, Windows Me, or Windows NT Workstation 4.0. If you have one of these operating systems, you can use Norton Ghost 2003, which is included in the box with Norton Ghost 9.0. Your computer must meet the following minimum requirements:

Operating system	Windows 9x/ME/NT Workstation 4.0
	Norton Ghost 2003 can also run under Windows 2000 Professional with 64 MB RAM and Windows XP Professional or Home with 128 MB RAM.
Processor	Pentium-compatible processor
RAM	32 MB
Hard drive space	35 MB
CD drive	Any speed
Floppy disk drive	High-density

Install Norton Ghost

Install Norton Ghost from the Norton Ghost CD.

If you have not already done so, close all other Windows programs.

To install Norton Ghost

1   Before installing Norton Ghost 9.0, you must first uninstall any previous versions of Drive Image or Norton Ghost.

2   Insert the CD into the CD-ROM drive.
    If your computer is not set to automatically open a CD, you will have to open it yourself.

3   In the Norton Ghost window, click **Install** Norton Ghost.

4   In the Welcome window, click **Next**.
    If install detects a previous version of Norton Ghost or Drive Image on your system, you must first uninstall the software before you can install Norton Ghost 9.0.

5   Read the license agreement, then click **I accept the terms in the license agreement.**
    If you decline, you cannot continue with the installation.

6   Click **Next**.

7   Confirm the installation location, then click **Next**.

8   Review the summary information, then click **Install**.
    If .NET Framework, a necessary component to use Norton Ghost, is not installed on the computer you are prompted to install it.
    If .NET Framework is already installed on the computer, the installation of Norton Ghost will continue; skip to the last step.

9   Click **OK** to install the .NET Framework.

10 In the dotnetfx.exe window, read the license agreement, then click **Yes** to accept the terms.
    If you click **No**, you will need to download and install .NET Framework from the Microsoft web site before using Norton Ghost.

11 In the Microsoft .NET Framework Setup window, click **Yes** to install the package.

12 Click **Next**.
The .NET Framework files are installed on your computer.

13 Click **OK** when the installation is complete.
The installation of Norton Ghost continues.

14 Click **Finish** to complete the installation.

After installation, click **Yes** to restart your computer and enable all Norton Ghost options.

After installation

After installation, ensure that you can access the recovery environment. To do this, boot your computer using the Norton Ghost CD or the Symantec Recovery Disk CD available with Norton SystemWorks Premier.

If the recovery environment does not run as expected, you can take action early to fix the problem. Then if your backed up computer experiences a catastrophic failure later and Windows does not start, you will be assured that you can run the recovery environment to recover the system or your data.

The troubleshooting section provides additional information to help you resolve issues that may exist with running the recovery environment on your system.

The following list includes common errors that you may see when you are having problems booting your computer from the Symantec Recovery Disk CD:

Your computer must be able to boot from the Norton Ghost CD or the Symantec Recovery Disk CD, available with Norton SystemWorks Premier.	See "I can't boot the computer from the CD" on page 102.
You must have the necessary storage drivers to access your backups for a restore.	See "I cannot access the local drive where my backups are saved." on page 103.

You must have the necessary NIC drivers to access files on a network	See "I can't access the network drive where my backups are saved." on page 103.
You may need to use information about your system that you would not generally know.	See "I don't know the system information that I'm required to enter." on page 97.

Activation protects you

Product activation is a technology that protects users from pirated or counterfeit software by limiting use of a product to those users who have acquired the product legitimately. Product activation requires a unique serial number for each installation of a product. You must activate the product within 30 days of installing it. Product activation is completely separate from registration.

When to activate your product

When you first run the software, you are asked to read and accept the license agreement and enter a serial number to activate the product.

If you choose not to activate at that time, you will receive alerts that will remind you to activate the product each time you start the software.

If you do not activate the product within 30 days of installing it, the product will stop working. You can activate it after the 30 days have elapsed.

To activate Norton Ghost, you must have a serial number. You can find the serial number on the Norton Ghost CD sleeve, DVD case, or in the download instructions, or in the email you received from Symantec.

To activate Norton Ghost

1 Do one of the following:
   - Start your product.
   - On the Norton Ghost console, click **Help** > **Unlock Trial Product**.

- ◧ On the Norton Ghost console, click the trial expiration date in the **Status** box of the Task pane.

2   Read the license agreement, then check **Accept license agreement** to accept the terms of the license agreement.

3   If you do not have a serial number for Norton Ghost (because you have not purchased the software), click **Buy Now** to pay for the software and receive a serial number.

4   In the **Serial Number** box, type the Norton Ghost serial number.

5   Click **Unlock Now**.

The licenser distinguishes your computer from others without storing information about you or your computer's hardware and software. Activating your software may trigger an optional registration. Registration data is generally used for demographic purposes and is not resold. You can opt out of marketing-oriented uses of your data as part of registration.

Basics

3

Basics include general information about how to:

- Start your Symantec product.
- Work with the product.
- Monitor your product's activities.
- Access more information.

Start Norton Ghost

You can start Norton Ghost from the Windows taskbar or from the Window system tray.

To start Norton Ghost

❖ Do one of the following:

- On the classic Windows taskbar, click **Start** > **Programs** > **Norton Ghost** > Norton Ghost.
- On the Windows XP taskbar, click **Start** > **All Programs** > **Norton Ghost** > Norton Ghost.

Start Norton Ghost from the tray icon

Norton Ghost adds an icon to the Windows system tray. By default, the Norton Ghost tray icon appears in the lower-right corner of your computer monitor on the Windows taskbar.

To start Norton Ghost from the system tray

1 In the Windows system tray, double-click the Norton Ghost tray icon.

Display the Norton Ghost tray icon menu

From the tray icon, you can quickly access the following Norton Ghost tools and information:

- ❚❚ Schedule backups or incremental backups using the Backup Job Wizard.
- ❚❚ Create an immediate backup image of a selected drive using the Drive Backup Wizard.
- ❚❚ Restore a selected drive using the Restore Drive Wizard.
- ❚❚ View currently scheduled backup jobs.
- ❚❚ Start Norton Ghost.
- ❚❚ Restore selected files or folders using the Backup Image Browser.
- ❚❚ Cancel the current backup operation.
- ❚❚ Display the product version number.

To display the tray icon menu

❖ Right-click the tray icon to display a quick menu of frequently used Norton Ghost tools.

Check the version number

You can check the version number of your product on your computer. Use the version number to help you find more information about your product on the Symantec Web site.

To check the version number

❖ Do one of the following:
  - ❙ Start your product, then on the Help menu, click **Help > About Norton Ghost 9.0**.
  - ❙ On the Windows system tray, right-click the Norton Ghost tray icon, then click **About Norton Ghost 9.0**.

Work with basic features

There are some basic features that will help you use Norton Ghost:

■ Basic and advanced views: Lets you view all Norton Ghost functionality (advanced view) or only the most commonly used features (basic view).

■ Backup Image Browser: Lets you restore files and folders, and manage and maintain backup image files.

Basic and advanced views

Norton Ghost includes two views. The basic view is the default. It includes a menu bar, icons for common tasks in the right pane, and shortcuts for switching views and doing tasks in the left pane.

The basic view provides quick, easy access to the most commonly used features. The advanced view provides a quick overview of the drives on the computer, backup jobs you have created, the backup history for each drive, and Norton Ghost-related event messages.

From the basic view, you can choose to back up a drive immediately. The advanced view lets you create backup *jobs* to schedule backups for the future and choose a regular schedule to repeat backups.

To change view to basic or advanced

❖ In Norton Ghost do one of the following:

■ Click **View** > **Advanced** to change to the advanced view

■ Click **View** > **Basic** to change to the basic view

Events viewer

You can use the Events viewer to display information, errors, or warnings that occur within the product.

To display the Events viewer

❖ In the advanced view of Norton Ghost, click the **Events** tab.

View backup history of a drive

You can view the backup image history of a drive and general status information, such as the backup and compression type, and where the image is stored.

You can also view a chronological history of all the backup images taken of selected drives (even if the backup image has been deleted from the storage location), including the original location of each backup image file.

The history file of backup images is written to a subdirectory under the default installation directory (Program Files\Symantec\Norton Ghost\Agent\History).

The picture icon next to each drive letter gives you a quick visual indication as to the type of backup that is being created (full, baseline, or incremental).

To view backup details

1 In the advanced view of Norton Ghost, click the **Backup History** tab.

2 Select a backup in the list box to view specific backup details about it.

Clean the backup history

Use Clean Backup History to delete the log file entries and backup images for Norton Ghost events *prior to* the last full backup you made (or the last base image you made with incrementals). For example, if you back up a machine every Sunday morning, and clean the backup history on Sunday afternoon, the history prior to last Sunday's backup would be erased.

When you use Clean Backup History, be aware that all backup history entries and associated backup image files prior to the last backup are deleted.

To clean the backup history

1 In the advanced view of Norton Ghost, click the **Backup History** tab.

2 On the **Tools** menu, click **Clean Backup History**.

Set default backup location

You can specify the default path where backup image files are stored. This default path is used if you do not specify a different path when you create a backup.

To set a default backup location

1 On the menu bar, click **Tools** > **Options**.

2 Click the **Default Settings** tab.

3 Select the default location for backup files in the drop-down list.

4 Depending on the default location you selected, specify the folder or CD/DVD drive where the backup image will reside. Your options are:

Local file	Stores the backup images on the computer that is being backed up.
	Specify a drive and folder (for example, **E:\Data_Backups**).

Network file	Stores the backup images on the network.
	Specify a UNC path (\\server\share) to a folder on the network where you want the backup image stored, or click **Browse** to navigate to the network folder.
	In the Backup Job Wizard, click **Next**. In the Connect As window, type a domain or computer name, user name, and password, then click **OK** to return to the Wizard.
CD-RW/DVD-RW	Stores the backup images on disk media.
	Make sure the media is new and blank. Partially written CD or DVD media should not be used.
	Click **CD-RW/DVD-RW**, then specify the CD or DVD drive where the backup images will be sent.
	If you do not have a writable CD or DVD drive, this option will not appear.

Set notification

You can set an option to send notification to a specified email address if there are any errors or warnings that occurred during the creation of a backup.

All notifications are automatically sent to the system event log and a custom log file located in the Agent folder of the product installation. (Click the **Events** tab in the advanced view of the console to review any information, errors, or warnings within the software.)

If notification are not being delivered, check the setup of your SMTP server to ensure it is functioning properly.

To set notification

1 On the menu bar, click **Tools** > **Options**.
2 Click the **Notifications** tab.

3 Select "Send notification..." to enable (turn on) the option.
 To turn off notification for the selected computer, deselect the option.

4 In the From address text box, type the email address (for example, **admin@domain.com**) where notifications will be sent regarding any important failures or events.

5 If desired, type the email address of the sender in the From address text field.
 If you do not specify a from address, the name of the product will be used.

6 In the SMTP server text box, type the path to the SMTP server that will send the email notification (for example, **smtpserver.domain.com**).

7 Click **OK**.

Manage image files

Backup Image Browser, included with Norton Ghost, simplifies the management and maintenance of your backup image files. Working within a single screen, Backup Image Browser gives you control of the backup image files you can access. For example, you can view backup image file contents, restore individual program and data files from the backup image, or you can mount a selected drive and share it across a network.

Backup Image Browser also displays backup image descriptions, so you can identify individual backup image files. You cannot modify folders and files from within an backup image and save them again as part of the image.

Start Backup Image Browser

Backup Image Browser is started from the Windows Start menu.

To start Backup Image Browser

1   On the Windows Start menu, click **Programs** > **Norton Ghost** > **Backup Image Browser**.
    By default, the Open dialog box is displayed each time you start Backup Image Browser.
2   To open an image file, do one of the following:
    - In the Open dialog box, select a backup image file to open.
    - In the Open dialog box, click **Cancel**, then select a recently opened backup image file from the **File** menu.

All the features of Backup Image Browser are accessed from the main program screen or by right-clicking anywhere in the tree pane or content pane.

Open a backup image in Backup Image Browser

You can open an image file within Backup Image Browser, or from Windows Explorer.

Ghost image files (.gho) that were created with previous versions of Norton Ghost are opened in Ghost Explorer.

To open an image file

1   In Backup Image Browser, click **File** > **Open**.
2   Navigate to a backup image file you want to open and view.
3   Double-click the backup image file.

The File menu on the menu bar maintains a list of the most recently opened backup image files.

You can also double-click a backup image file from Windows Explorer to open it directly in Backup Image Browser.

Use the tree pane

The left pane in the Backup Image Browser shows a hierarchical tree view of all the backup image files that you have opened.

From the tree pane you can:

- Mount or dismount a drive inside a backup image.
- Verify that the selected backup image file is valid.
- Browse folders inside a backup image.
- View the properties of a selected backup image file.
- Open or close backup image files.
- Export a backup image.

Use the content pane

The right pane in the Backup Image Browser shows the contents of the drive, folder, backup image file, or volume you have selected in the tree pane.

Depending on if you have selected a backup image, volume, folder, or file you can do the following directly from the content pane:

- Restore selected files and folders from within a backup image file.
- Mount or dismount a drive inside a backup image.
- View the contents of a selected file.
- View the properties of a selected volume.

Keep current with LiveUpdate

Using your Internet connection, you can use LiveUpdate to obtain program updates for your computer.

Program updates are minor improvements to your installed product. These differ from product upgrades, which are newer versions of entire products. Program updates that have self-installers to replace existing software code are called patches. Patches are usually created to extend operating system or hardware compatibility, adjust a performance issue, or fix bugs.

LiveUpdate automates the process of obtaining and installing program updates. It locates and obtains files from an Internet site, installs them, and then deletes the leftover files from your computer.

When you should update

Run LiveUpdate as soon as you have installed your product. Once you know that your files are up-to-date, run LiveUpdate periodically to obtain program updates. For example, to keep all installed Symantec products current, you may want to use LiveUpdate once a week. Program updates are released on an as-needed basis.

Obtain updates using LiveUpdate

LiveUpdate checks for updates to all of the Symantec products that are installed on your computer.

To obtain updates using LiveUpdate

1. At the top of the main window, click **Help** > **LiveUpdate**.
2. In the LiveUpdate window, click **Next** to locate updates.
3. If updates are available, click **Next** to download and install them.
4. When the installation is complete, click **Finish**. Some program updates may require that you reboot your computer before the changes will take effect.

Obtain updates from the Symantec website

When new updates become available, Symantec posts them on the Symantec Web site. If you can't run LiveUpdate, you can obtain new updates from the Symantec Web site.

For more information

The product documentation provides glossary terms, online Help, a Readme file, and the User's Guide in PDF format.

Look up glossary terms

Technical terms in the User's Guide are defined in the glossary, which is also available in the User's Guide PDF.

Use online Help

Help is available throughout your Symantec product. Help buttons or links to more information provide information that is specific to the task that you are completing. The Help menu provides a comprehensive guide to all of the product features and tasks that you can complete.

To use online Help

1 At the top of the main window, click **Help** > **Contents**.

2 In the Help window, in the left pane, select a tab. Your options are:

Contents	Displays the Help by topic
Index	Lists Help topics in alphabetical order by key word
Search	Opens a search field in which you can enter a word or phrase

Readme file

The Readme file contains information about installation and compatibility issues. It also contains technical tips and information about product changes that occurred after this guide went to press. It is installed on your hard drive in the same location as the product files.

To read the Readme file

1 In Windows Explorer, double-click **My Computer**.

2 Double-click the hard disk on which you installed Norton Ghost.
In most cases, this will be drive C.

3 Click **Program Files** > **Symantec** > **Norton Ghost** > **Shared** > **EN** or **Program Files** > **Norton SystemWorks** > **Norton Ghost** > **Shared** > **EN** (Norton SystemWorks Premier only).

4 Double-click **Readme.txt**.
The file opens in Notepad or your default word processing program.

5 Close the word processing program when you are done reading the file.

Access the User's Guide PDF

The Norton Ghost User's Guide is provided on the CD in PDF format. You must have AdobeAcrobat Reader installed on your computer to read the PDF.

To read the User's Guide PDF from the CD

1 Insert the CD into the CD drive.

2 Using Windows Explorer, double-click the language folder (EN for English) on the CD.

3 Double-click UserGuide.pdf to open the Norton Ghost user's guide.
You can also copy the User's Guide to your hard disk and read it from there.

Creating Backup Images

4

Backup images can be created manually or scheduled to run at a specified time. The following information may help when you create backup images:

- You may find it helpful to test backups. That is, if a manual backup is successful and the backup image is stored in the location you want, you can use the Backup Job Wizard to create subsequent backups at regular intervals.
- Norton Ghost does not need to be open for a backup to take place. Therefore, after you create a backup job, you can exit Norton Ghost. Your computer, however, must be running so a backup or backup job can occur. To verify that a backup was made, check the information in the Backup History tab or the Events tab, both found in the advanced view.
- All backup jobs are saved, so you can edit or run them later.
- Do not run a disk defragmentation program while a backup image is being created. Doing so will cause unexpected results.

Manually creating a backup image

You can create a backup image manually. This is particularly useful if you are about to install a new product, some critical files have changed, or many file changes have occurred in a session, and you need to create a backup immediately. This is also useful if you want to make an initial backup image of a computer to

ensure it is successful, then use the Schedule Incremental Backups (Backup Job Wizard) feature to automate the creation of any subsequent backups.

If you prefer to schedule the creation of backup images instead of creating them manually, use the Backup Jobs Wizard.

Norton Ghost supports saving backup image files to a network hard disk or to a local hard disk (including USB and FireWire drives, Zip, JAZ, SuperDisk, and magneto-optical). It does not support saving backup image files directly to a tape drive. To save backups to tape, save the backup to another drive, then use your existing tape backup strategy to save the backup image to tape.

During the creation of backup images, you should exit any partitioning software that is running, such as Norton PartitionMagic.

You can use Norton Ghost to back up a database.

To manually create a backup image

1 In the basic view of the Norton Ghost window, click **Tools** > **Back Up Drive**.
2 Click **Next**.
3 Select one or more drives to back up.
   A separate backup image file will be created for each drive you select.
   You can click a drive letter to view a graphical representation of the drives used and total free space. A drive with a red "X" next to it indicates that the drive is not available for backing up. This is usually because the drive has been deleted, or the entire hard disk has been removed from the computer since you installed Norton Ghost.
4 Click **Next**.

5 Select the location where you want the backup images stored:

Local file	Stores the backup images on the computer that is being backed up.
	Specify a drive and folder (for example, **E:\Data_Backups**).
Network file	Stores the backup images on the network.
	Specify a UNC path (\\server\share) to a folder on the network where you want the backup image stored, or click **Browse** to navigate to the network folder.
	In the Backup Job Wizard, click **Next**. In the Connect As window, type a domain or computer name, user name, and password, then click **OK** to return to the Wizard.
CD-RW/ DVD-RW	Stores the backup images on disk media.
	Make sure the media is new and blank. Partially written CD or DVD media should not be used.
	Click **CD-RW/DVD-RW**, then specify the CD or DVD drive where the backup images will be sent.
	If you do not have a writable CD or DVD drive, this option will not appear.

If you receive a message stating that there may not be enough available space at the specified location, you should specify a new location rather than continuing with the Wizard and possibly not being able to save a complete backup image.

6 If you want to rename a backup image instead of using the default filename, select a backup image

filename from the list box, click **Rename**, then type a new name.
If a backup image spans multiple media, the filenames for subsequent files will be appended with _S01, _S02, and so forth. For example, if the default filename were C_Drive.V2i, the second filename would be C_Drive_S01.V2i, and so on.

7   Click **Next**.

8   In the **Compression** drop-down list, select one of following compression levels:
    ▪ None
    ▪ Standard
    ▪ Medium
    ▪ High

9   If you want to determine whether a backup image file is valid or corrupt immediately following its creation select **Verify backup image file after creation**.

10 If you want to split the backup image file into smaller files, then select **Divide the backup image into smaller files to simplify archiving**, then type the maximum size (in MB) for each file.
    For example, if you plan to copy a backup image to CDs, specify a file size of 700 MB or less.

11 In the Description text box, type a description that you want associated with the backup image.
    The backup image file size and creation date are automatically appended to the description, so you do not need to enter this information.

12 If you want to set additional options such as adding a password to the backup image, click **Advanced**.
    When you finished setting the advanced options, click **OK** to return to the Wizard.

13 Click **Next** to review the backup options you have selected.

14 Click **Next** to create the backup image immediately.
    You can click **Close** to exit the Wizard or you can exit Norton Ghost entirely; the backup will continue until it is finished.

Select a storage location for backup images

When deciding where to store backup images, you should consider the following information.

Backup image location	Description
Local file	Use this option to store the backup images on the local computer that is being backed up. It is possible to save the backup image to the same drive that you are backing up; however, it is not recommended because as the number or size of backups grows, you will have less disk space available for regular use. (Also, the backup image itself will be included in subsequent backups of the drive, increasing the size of those backups.) Saving the backup to a separate drive, a network location, or removable media eliminates this problem.
	You can use Norton PartitionMagic to create new partitions (drives) on your computer hard disk that are dedicated to storing backup images.
Network file	Use this option to save backup images files to a network folder.
	When you click **Next** in the Wizard, the Connect As window appears. Type a domain or computer name, a user name, and password, then click **OK** to continue with the Wizard.
	⚠ The user name you type must have read-write access to the network folders where the backup image files will be stored. Norton Ghost uses this login information to access the network when you create a backup image.
CD-RW/ DVD-RW	When you save a backup image to removable media, the files will automatically be split into the correct sizes if the backup spans more than one media.
	This option is not available with scheduled backup jobs.

The following table gives you additional information regarding the advantages and disadvantages of different types of storage locations for backup image files.

Location	Advantages	Disadvantages
Hard drive	▪ Fast create and restore ▪ Can schedule unattended backups ▪ Inexpensive because drive space can be overwritten repeatedly	▪ Uses valuable drive space ▪ Vulnerable to loss if the hard drive fails
Network drive	▪ Fast create and restore ▪ Can schedule unattended backups ▪ Inexpensive because drive space can be overwritten repeatedly ▪ Protection from local hard drive failure ▪ Off-site storage (through existing network backup strategies)	▪ Must have supported NIC drivers to restore from the recovery environment ▪ Must understand and assign the appropriate rights for the users who will perform backups and restores
Removable media (local)	▪ Protection from hard drive failure ▪ Ideal for off-site storage ▪ Reserves hard drive space for other uses	▪ Cannot create unattended backups; process is manual ▪ Cannot create incremental backups; full backup only ▪ Media can be expensive ▪ Restore can be slower than from other locations, especially for individual files and folders ▪ You cannot save backup images to DVD-RAM drives under Windows 2000.

Location	Advantages	Disadvantages
USB/ FireWire drive (local)	▪ Fast create and restore ▪ Can schedule unattended backups ▪ Inexpensive because drive space can be overwritten repeatedly ▪ Off-site storage is possible ▪ Reserves hard drive space for other uses	▪ Additional expense for the drive itself ▪ Must have supported storage device drivers to restore from the Symantec Recovery Disk CD; could require additional media along with the Symantec Recovery Disk CD

Set a compression level

Compression results may vary depending on the types of files saved in the drive you are backing up.

Compression level	Description
None	This is most useful if storage space is not an issue. However, if you are saving the backup image file to a busy network drive, using high compression may be faster than no compression because there is less data to write across the network.
Standard	Uses low compression for a 40% average data compression ratio on backup image files. This is the default.
Medium	Uses medium compression for a 45% average data compression ratio on backup image files.
High	Uses high compression for a 50% average data compression ratio on backup image files. This is usually the slowest method. When a high compression backup image is created, CPU usage may be higher than normal. Other processes on the computer may also be slower.

Verify a backup image

If this option is selected, the image will be checked to see that all of the files in the backup image are available for

you to open, the internal data structures in the backup image file match the data that is available, and the backup image file can be uncompressed to create the expected amount of data (if you selected a compression level at the time of creation).

⏻ Be aware that verifying an image doubles the time (approximately) required to create the backup image.

If you decide not to verify the image at the time of creation, you can still check the integrity of a backup image any time after it is created by opening the file in the Backup Image Browser.

Check the integrity of a backup image using the Backup Image Browser

You can use Verify Backup Image anytime after a backup is created to determine whether a backup image file is valid or corrupt. Backup Image Browser checks to see that all of the files in the backup image are available for you to open, the internal data structures in the backup image file match the data that is available, and the backup image file can be uncompressed and create the expected amount of data.

To check the integrity of a backup image

1 In the tree pane of the Backup Image Browser, select the backup image file.

2 On the menu bar, click **File** > **Verify Backup Image**.

3 When the check is complete, click **OK**.

If you prefer, you can have backup images automatically verified for integrity at the time they are created.

Split a backup image file into smaller files

This option is useful if you are creating a backup image file that you know you will copy to removable media later for safekeeping. The backup image will be split into smaller, more manageable segments. (Later, you can copy the segments onto separate, removable media. If Norton Ghost creates an .sV2i file in addition to the .V2i

files, you should save the .sV2i file on the same media as the first .V2i file.)

If you are creating a backup of thousands of files on a computer that has low memory, splitting the backup image into smaller segments may help speed the process.

If you are creating a backup directly to removable media, you do not need to select this option; the backup will be split into multiple files automatically to fit on the media you selected. (Does not apply to scheduled back ups.)

If a backup image is divided into multiple files, the filenames for subsequent files will be appended with _S01, _S02, and so forth. For example, if the default filename were C_Drive.V2i, the second filename would be C_Drive_S01.V2i, and so on.

Set advanced backup options

You can set the following additional options when creating a backup image.

Option	Action
Use password	This option sets a password on the backup image. Passwords can use standard characters, not extended characters or symbols. (Use characters with an ASCII value of 128 or lower.) A user must type this password before restoring a backup or opening it in the Backup Image Browser.
Ignore bad sectors during copy	This option lets you create a backup even if there are bad sectors on the hard drive. Although most drives do not have bad sectors, the potential for problems increases during the lifetime of the hard drive.
Disable SmartSector Copying	SmartSector technology speeds up the copying process by only copying clusters and sectors that contain data. However, in some cases, it may be desirable to copy all clusters and sectors in their original layout, whether or not they contain data. This option lets you copy both used and unused clusters and sectors. Selecting this option increases processing time and usually results in a larger backup image file size.

To specify a password

❖ In the Advanced Options dialog box, select **Use password**, then type the password and confirmation password.
You can remove the password from the backup image file using the Export Backup Image feature in the Backup Image Browser.

To ignore bad sectors during copying

❖ In the Advanced Options dialog box, select **Ignore bad sectors during copy**.

To disable SmartSector copying

❖ In the Advanced Options dialog box, select **Disable SmartSector Copying**.

Back up dual-boot systems

You can back up dual-boot systems, or systems that are running more than one operating system, even if you have drives (partitions) that are hidden under the operating system where you run Norton Ghost.

Everything on the drive you select will be included in the backup, so it will be bootable later if you restore it. An exception to this is if you back up a bootstrapped operating system, you must back up–and then restore–every drive that includes operating system boot information in order for your computer to boot the same from a restored system as it did from the original configuration.

Schedule incremental backup images

You can create backup jobs to automate the creation of backup images using a daily, weekly, or monthly schedule. This method is useful if you want to create full backup images during off-hours when you are not present or if you want to create a baseline with incremental backup images without interrupting your normal workflow. The computer must be turned on to

perform a backup, but Norton Ghost does not need to be running.

If you prefer to manually create full backup images, use the Drive Backup Wizard.

You can use Norton Ghost to back up a database.

To schedule a backup image

1   In the basic view of the Norton Ghost window, click **Tools** > **Schedule Incremental Backups**.

2   Click **Next**.

3   In the Backup Type window, select the type of backup images you want to create.

4   Select one or more drives to back up. (Shift+click to select a group of contiguous drives, or Ctrl+click to select non-contiguous drives.)
    A separate backup image file will be created for each drive you select.
    You can click a drive letter to view a graphical representation of the drives used and total free space. A drive with a red "X" next to it indicates that the drive is not available for backing up. This is usually because the drive has been deleted, or the entire hard disk has been removed from the computer since you installed Norton Ghost.

5   Click **Next**.

6 Select the location option where you want the backup images stored. Your options are:

Local file	Stores the backup images on the computer that is being backed up.
	Specify a drive and folder (for example, **E:\Data_Backups**).
	It is possible to save the backup image to the same drive that you are backing up; however, it is not recommended because as the number or size of backups grows, you will have less disk space available for regular use. (Also, the backup image itself will be included in subsequent backups of the drive, increasing the size of those backups.) Saving the backup to a separate drive or a network location eliminates this problem.
Network file	Stores the backup images on the network.
	Specify a UNC path (\\server\share) to a folder on the network where you want the backup image stored, or click **Browse** to navigate to the network folder.
	Click **Next**. In the Connect As window, type a domain or computer name, user name, and password, then click **OK** to return to the Wizard.

If you receive a message stating that there is not enough available space at the specified location, you should specify a new location rather than continuing with the Wizard and possibly not being able to save a complete backup image.

Because backup jobs are designed to run without user intervention (possibly when the computer is unattended), you cannot save incremental backups directly to removable media.

7 To rename a backup image instead of using the default filename, select a backup image filename from the list box, click **Rename**, then type a new name. By default, filenames for scheduled full backups or base images will be appended with 001.v2i, 002.v2i, and so forth. Filenames for incremental backups based on the base image will be appended with _i001.iv2i, _i002.iv2i, and so forth. So if your base image were called C_Drive001.v2i, the first incremental backup would be called C_Drive001_i001.iv2i.

8 Click **Next**.

9 Specify the frequency and time of the backup images. Your options are:

Option	Description
Once	One full backup image is created at the date and time you specify. This option applies to full backups only.
Weekly	■ Full Backups: A full backup image is created at the time and days of the week you specify. ■ Base with Incrementals: A base backup image is created at the time and days you specify; incremental backup images are created at the time and interval you specify.

Option	Description
Monthly	⊞ Full Backups: A full backup image is created at the time and days of the month you specify. ⊞ Base with Incrementals: A base backup image is create at the time and days of the month you specify; incremental backup images are created at the time and on the days of the week you specify.
No schedule (save for later)	Save all the backup settings except the schedule. You can later run the backup job at your convenience by clicking the Backup Job tab in the advanced view, selecting the backup job, then clicking **Tools > Run Job Now**. You can assign a schedule at a later time by selecting the backup job, then clicking **Tools > Edit Job**.

10 Click **Next**.

See "Set a compression level" on page 35.

11 In the Compression drop-down list, select one of following compression levels:
- None
- Standard
- Medium
- High

See "Verify a backup image" on page 35.

12 If you want to determine whether a backup image file is valid immediately following its creation select **Verify backup image file after creation**.

See "Split a backup image file into smaller files" on page 36.

13 If you want to split the backup image file into smaller files, then select **Divide the backup image into smaller files**, then type the maximum size (in MB) for each file.
For example, if you plan to copy a backup image to CDs, specify a file size of 700 MB or less.

14 Select **Limit the number of full or baseline backups saved for each drive**, then type a number in the text field.
When this limit is reached, each successive backup image (whether full or base) is first created and stored, then the oldest, previously created backup image file is deleted (including all associated incrementals if it is a base image) from the same storage location.

⏻ Be sure you have enough hard disk space to accommodate the number of backup images you specify, plus one additional backup image. If you run out of hard disk space before the number of specified backup images is reached, the recurring backup image process will no longer complete successfully and a current backup image will not be created.

15 In the Description text box, type a description that you want associated with the backup image.
The backup image file size and creation date are automatically appended to the description, so you do not need to enter this information.

16 If you want to set additional options, such as adding a password to the backup image, click **Advanced**.
When you are finished setting the advanced options, click **OK** to return to the Wizard.

17 Click **Next** to review the backup options you have selected.

18 Click **Finish**.

⏻ Norton Ghost does not need to be open for a backup job to take place. Therefore, after creating a backup job, you can exit Norton Ghost. Your computer, however, must be running so the backup job can occur at the scheduled time.

Verify that a backup completed

You can verify that a backup was successfully made by checking the information in the Backup History tab or the Events tab.

To verify that a backup completed

❖ In the advanced view of Norton Ghost, do one of the
   following:
   ▪ Click the **Backup History** tab.
   ▪ Click the **Events** tab.

Select a backup type

There are two types of scheduled backups that you can
create.

Full backups	A full backup includes the following advantages and disadvantages:
	▪ The entire selected drive is backed up.
	▪ The Backup Job Wizard does not let you save full backup images to removable media. If you want to save full backups to removable media, you should create the backup manually.
	▪ A full backup image is not associated with incremental backup images in any way. Full backups stand on their own, so using full backups is a less complicated backup method than using a base with incrementals.
	▪ You can take a full backup image of a drive (using the Run Job Now feature) even if that drive is currently being tracked using Base with Incrementals.
	See "Run a scheduled backup job immediately" on page 45.

Base with incrementals	A base with incrementals includes the following advantages and disadvantages:
	‡ It creates a baseline backup image then backs up only the hard disk sectors that have changed since the previous base image or previous incremental.
	‡ The Backup Job Wizard does not let you save a baseline backup image with incrementals to removable media.
	‡ It requires the least amount of time to create compared to full backups and makes better use of storage media.
	‡ A baseline image differs from a full backup image in that incremental tracking is turned on for the selected drive.
	‡ A baseline image is associated only with its own incremental backups.
	‡ If you use the base with incrementals option to back up a hard drive, when you restore to a given point-in-time, the baseline image plus all the incrementals taken up to that point-in-time are used for the restore. For example, suppose you have a baseline image with eight incremental backups. You decide to restore to the point-in-time that the fourth incremental was taken. When you restore, the baseline image and the first four incrementals are used to restore the backup.
	(!) The baseline image and all associated incrementals must remain together in the same folder. If any piece is missing, the backup image set becomes invalid and you will not be able to restore the data.

Run a scheduled backup job immediately

You can use Run Job Now to immediately create a full backup image, a baseline backup image, or an incremental backup image of the drive's most recent changes.

For example, you can take a full backup image of a drive even if that drive is currently being tracked using a Base with Incrementals job.

To use Run Job Now, you must have already created a backup job.

To run a scheduled backup job immediately

1   In the advanced view, click the **Backup Jobs** tab.
2   Select a backup job name from the list box, then click **Tools** > **Run Job Now**.
3   Click a backup type. Your options are:

Option	Description
A full independent backup	Creates a full backup image using the options saved in the job. It is available for Full Backup and Base with Incremental jobs.
A baseline backup	Creates a baseline backup image of the selected drives. See "Select a backup type" on page 44. It is available for Base with Incremental jobs only.
An incremental backup of recent changes	Creates an incremental backup image using the options saved in the job. It is available for Base with Incremental jobs only.

4   Click **OK**.

Edit a backup job schedule

You can edit any of the schedule properties for a backup job, except the selected drives.

To edit a backup schedule

1   In the advanced view, click the **Backup Jobs** tab.
2   In the list box, select a backup job.
3   Click **Tools** > **Edit Job** to open the selected job in the Backup Job Wizard and change its properties

Delete a backup job schedule

You can remove a backup schedule from the Backup Jobs tab.

To delete a backup schedule

1 In the advanced view, click the **Backup Jobs** tab.
2 In the list box, select a backup job.
3 Click **Tools** > **Remove Job**.

Disable a backup job schedule

You can disable or "turn off" a backup schedule, then re-enable it later.

To disable a backup schedule

1 In the advanced view, click the **Backup Jobs** tab.
2 In the list box, select a backup job.
3 Click **Tools** > **Disable Schedule** or **Enable Schedule**.

Back up databases

The following process backs up business-critical databases with less downtime than required by traditional back up methods.

To back up databases

1 Quiesce the main database.
2 Stop processing all transactions.
3 Close out pending transactions.
4 Send the new transactions to log files.

See "Manually creating a backup image" on page 29.

5 Use Norton Ghost to manually create a backup image. Norton Ghost snaps a "virtual volume image."

6 Bring the database back online.
While Norton Ghost works in the background to write the data from the virtual image to the backup file, your database is already back up and running.

Add users who can back up a computer

You can use the Norton Ghost Security Configuration Tool to give additional users and groups rights to use the Norton Ghost console.

To give users the ability to back up a computer

1 On the Windows Start menu, click **Programs** > **Norton Ghost** > **Security Configuration Tool**.

2 Click **Add**.

3 In the Add Users and Groups window, select a user or group, then click **Add**.
   The user or group will appear in the text box at the bottom of the window.

4 Click **OK**.

5 If you want to delete users or groups, select a user or group, then click **Remove**.

6 In the Security Configuration Tool dialog box, click **Close** to exit the dialog.
   You must now stop, then restart the Norton Ghost Service.

7 On the Windows Start menu, click **Run**.

8 In the Open text box, type **services.msc** and then click **OK**.

9 In the Name column, right-click **Norton Ghost**, then click **Stop** to stop the service.

10 In the Name column, right-click Norton Ghost again, then click **Start** to restart the service so your changes will take effect.

Export a backup image

You can export an open backup image file in Backup Image Browser to accommodate various methods of archiving or to make a copy of a backup with different characteristics than the original. Be aware that this feature does not modify an existing backup image; rather, it copies the backup image and assigns the new characteristics to the copied file.

Exporting a backup lets you do the following:

- Split the file into smaller sizes so it can be copied to other types of storage media.
- Consolidate a spanned set into one backup image file.
- Consolidate an incremental set (a base backup image and all associated incremental backup images) into one backup image file or a spanned set.
- Change the description or compression level of the backup image.
- Add a password to the backup image.

To export a backup image

1 In the tree pane of the Backup Image Browser, select a backup image file that you have opened.

2 On the menu bar, click **File** > **Export Backup Image**.

3 In the Filename text box of the Export Backup Image File window, select a location where you want the backup image stored and specify the filename for the backup image file. The new filename must have a .v2i

extension. You cannot choose the same location and filename as the existing backup image.

Store the backup image on the local computer	Specify a drive and folder (for example, **E:\Data_Backups**) located on the local computer where you want the backup image stored.
	While you can save backup images locally, it is generally not recommended. If the computer suffers a catastrophic failure such as a primary hard drive going bad, you may not be able to recover the backup image you need. Consequently, it is highly recommended that you save backup images to a secondary hard drive or to the network.
Store the backup image on the network	Specify a UNC (Universal Naming Convention) path on the network where you want the backup image stored, or click **Browse** to navigate to the network folder where you want the backup image stored.

4 If you want to split the backup image, click **Divide the backup image into smaller files for archiving**, then select the maximum megabyte size for each file from the drop-down list.
For example, if you plan to copy a backup image to CDs, specify a file size of 700 or less.
This option is useful for creating a backup image file that you will copy to removable media for safekeeping. The backup image is split into smaller, more manageable segments. (Later, you can copy the segments onto separate, removable media. If Norton Ghost creates an .sv2i file in addition to the .v2i files, you should save the .sv2i file on the same media as the first .v2i file.)

5 In the Description text box, type a description that you want associated with the backup image.

6 In the Compression Level group box, select one of following compression levels:
- None
- Standard
- Medium
- High

7 If you want to assign a password to a backup image file, click **Use password**.
A user must type this password before restoring a backup or opening it in the Backup Image Browser.

8 If you ever want to remove a password from a backup image file, make sure that **Use password** is not selected.

9 Click **OK**.

Deleting backups

You can delete backups when they are no longer needed or if you need to make more space available in the backup location. Just select the .v2i or .iv2i file in Windows Explorer and delete it. (Be aware, however, that the Backup History tab in the advanced view of Norton Ghost will not be updated to reflect the deletion.)

If you delete any file that is part of a backup set (a base backup image and incremental backups), you will not be able to recover data from the remaining backup files in that set.

Restoring Files and Folders

5

There are two different methods you can use to restore files and folders on a computer. Each restore method, as described in the table below, takes into account the functionality that is or is not available on the computer. In many instances, you do not need to take the computer down to complete a restoration.

Before you can restore a computer, you must have a backup image already created. You cannot restore data on a computer if a backup image of that computer does not exist.

Problem	Restore method
You can boot into the operating system on the computer but you have lost data, programs, or hardware files on a drive (excluding operating system files).	Restore selected files and folders from a backup image using Backup Image Browser within Windows. See "Restore files from a backup image" on page 54. The computer does not requires a restart before you can access files.

Problem	Restore method
You cannot boot into the operating system, and you have lost hardware, data, or program files on a drive.	Restore selected files and folders from inside a backup image using Backup Image Browser from the recovery environment. See "Restore files using the recovery environment" on page 57. For tips and troubleshooting information when you are restoring from the recovery environment, see "Recovery environment troubleshooting" on page 81. For information about the using the advanced support utilities under the recovery environment, see "Using the support utilities" on page 78.

Restore files from a backup image

If you are able to run the operating system on a troubled computer, you can use the Backup Image Browser to restore individual files or folders from a backup image–all with zero downtime to the computer. This method of recovery, sometimes known as a hot restore, is useful if you have traced the cause of a computer failure to a certain file or folder of files, or you have simply lost important data files and do not want to restore an entire backup image using the Restore Drive Wizard.

If your backup image is on removable media, you can copy the segments of the backup to a fixed drive and restore files from the fixed drive.

To restore files from a backup image

See "Start Backup Image Browser" on page 23

1 In the tree pane of the Backup Image Browser double-click the backup image file that contains the drive with the folders or files you want to restore.

2 Double-click the desired drive.

3 Select the files or folders you want to restore.
Press <Ctrl+A> to select all items.
To select a group of files that are next to each other, click the top file, then hold down <Shift> and click the last file in the list.
To select a group of files that are not next to each other, hold down <Ctrl> while selecting the files you want.

4 On the menu bar, click **File** > **Restore**.
Where possible, the Restore Items dialog box will automatically fill in the Restore to this folder text field with the original path when the backup image was created. If the original location does not include a drive letter (because the drive was hidden when you created the backup image), you must enter a drive letter for the drive before you can restore any files or folders.
If the original path is unknown, or you want to restore the selected files to a different location, click **Browse** to locate the destination.

5 Click **Restore** to restore the files.

When file restoration is complete, you are returned to the Backup Image Browser main window.

Edit files within a backup image

You can open files from within a backup image. However, you must restore a file from within a backup before making modifications to it, or your changes will be lost.

Mount a drive within a backup

You can mount a drive within a backup image file (.v2i, .iv2i, or .pqi) by assigning it a drive letter that is visible from Backup Image Browser and Windows Explorer. You can perform a variety of tasks on the drive such as run ScanDisk (or CHKDSK), perform a virus check, copy folders or files to an alternate location, or simply view disk information about the drive such as used space and free space. You may also be able to run executable programs that exist within the mounted backup image.

When a drive is mounted, you can set it up as a shared drive. Users on a network can connect to the shared drive and restore files and folders from within the backup image.

You can mount one or more backup images at a time. The drives will remain mounted until you dismount them or restart the computer. Mounted drives do not take up extra hard disk space.

All security on NTFS volumes remains intact when it is mounted.

It is not necessary to mount a drive to restore files or folders from within a backup image.

Any data written to a mounted V2i drive, including creating, editing, or deleting files, will be lost when the drive is dismounted.

To mount a drive from Backup Image Browser

1 In the tree pane of the Backup Image Browser, select the backup image file that contains the drive you want to mount.
2 On the menu bar, click **File** > **Mount V2i Drive**.
3 In the Mount V2i Drive window, select the drive label you want mounted.
4 In the Drive letter drop-down list, select a letter that you want associated with the drive .
5 Click **OK**.

To mount additional drives, repeat the steps 1-5.

To mount a drive from Windows Explorer

1 In Windows Explorer, navigate to a backup image file.
2 Right-click the backup image file, then click **Mount**.
3 In the Mount V2i Drive window, select the drive label you want mounted.
4 In the Drive letter drop-down list, select a letter that you want associated with the drive .
5 Click **OK**.

To mount additional drives, repeat steps 1-5.

The mounted backup drive appears in the tree pane of the Backup Image Browser and Windows Explorer is automatically opened to the drive letter of the mounted drive.

Dismount a backup drive

Restarting the computer will dismount all mounted V2i drives in Windows Explorer and Backup Image Browser. You can also dismount them without restarting.

To dismount a drive in Backup Image Browser

1 In the tree pane of the Backup Image Browser, select a mounted backup image file.

2 On the menu bar, click **File** > **Dismount V2i Drive**.

To dismount all drives in Backup Image Browser

1 In the tree pane of the Backup Image Browser, click **Mounted V2i Drives**.

2 On the menu bar, click **File** > **Dismount All V2i Drives**.

3 Click **Yes**.

To dismount a drive in Windows Explorer

1 In Windows Explorer, navigate to the mounted V2i drive.

2 Right-click the drive, then click **Dismount V2i Drive**.

Restore files using the recovery environment

You can use the Norton Ghost CD or the Symantec Recovery Disk CD (available with Norton SystemWorks Premier) to boot into the recovery environment and restore files from within a backup image.

When you are running the recovery environment, there are several support utilities that you can run to troubleshoot networking or hardware issues you may

encounter. For example, you can ping a server, renew IP addresses, or get information about a hard disk partition table.

To restore files using the recovery environment

1 Boot the computer into the recovery environment.

2 Click **Advanced Recovery Tasks**.

3 Click **Backup Image Browser**.

4 In the Open dialog box, open the backup image file that contains the backup image folders or files you want to restore.
Drive letters under the recovery environment may not match those in the Windows environment.

5 In the tree pane, double-click the desired drive.
You can also click **File** > **Open** to locate the backup image file you want. If you are unable to see or browse the network from the Open dialog box, type the name of the server and share that holds your backup images, in the File name text box (syntax example: **\\server_name\share_name**), then press <Enter>. Select a backup image file, then click **Open** to add it to the tree pane of the Backup Image Browser. Double-click the backup image filename to display the available drives.

If you are still unable to see your network after typing the server name and share name, you may need to map a drive to see and browse the network.

6 From the content pane of the Backup Image Browser, select the files or folders you want to restore.

- Press <Ctrl+A> to select all items.
- To select a group of files that are next to each other, click the top file, then hold down <Shift> and click the last file in the list.
- To select a group of files that are not next to each other, hold down <Ctrl> while selecting the files.

7 On the menu bar, click **File** > **Restore**.

8 Where possible, the Restore Items dialog box will automatically fill in the Restore to this folder text box with the original path when the backup image was

created. If the original location does not include a drive letter (because the drive was hidden when you created the backup image), you must enter a drive letter for the drive before you can restore any files or folders.

If the original path is unknown, or you want to restore the selected files to a different location, click **Browse** to locate the destination.

9 Click **Restore** to restore the files.

View the properties of a backup image

You can view the following properties of a backup image:

Image property	Description
Description	A user-assigned comment associated with the backup image. The description is entered during the Drive Backup Wizard, Backup Job Wizard, or when you use the Export Backup Image feature in the Backup Image Browser.
Size	The total size (in megabytes) of the backup image.
Created	The date and time that the backup image file was created.
Compression	The compression level used in the backup image.
Spanned	Whether the entire backup image file is spanned over several files.
Password protected	Identifies whether or not the selected drive is password protected. You can assign a password to a backup image in the Advanced Options area of the Drive Backup Wizard and the Backup Job Wizard, or when you use the Export Backup Image feature in the Backup Image Browser.
Version	The version number of the backup image file.

To view the properties of a backup image

1 In the tree pane of the Backup Image Browser, select the desired backup image file.

2 Do one of the following:

- ▪ On the menu bar, click **File** > **Properties**
- ▪ Right-click the backup image file and click **Properties**.

View drive properties of a backup image

You can view the following drive properties of a backup image:

Drive property	Description
Description	A user-assigned comment associated with the drive.
Original drive letter	The original drive letter that was assigned to the drive.
Cluster size	The cluster size (in bytes) used in a FAT, FAT32, or NTFS drive.
File system	The file system type (for example, FAT, FAT32, and NTFS) used within the drive.
Primary/Logical	The selected drive's drive status as either Primary (primary partition) or Logical (logical partition).
Size	The total size (in megabytes) of the drive. This total includes both used and free space.
Used space	The amount of used space (in megabytes) within the drive.
Unused space	The amount of free or unused space (in megabytes) within the drive.

To view the drive properties of a backup image

1 In the tree pane of the Backup Image Browser, double-click the backup image file that contains the desired drive.

2 Select a drive.

3 Do one of the following:

- ▪ On the menu bar, click **File** > **Properties**.

▪ Right-click the backup image file and click
Properties.

View a file within a backup image

You can open a backup image file in Backup Image
Browser to view its contents in the program associated
with that file type. If a particular file type is not
registered for viewing in a program, the Microsoft Open
With dialog box is displayed. You can then select the
program that you want the file to open in.

You cannot view encrypted files system (EFS) NTFS
volumes using Backup Image Browser.

To view a file within a backup image

1 In the tree pane of the Backup Image Browser, double-
   click the backup image file to reveal the list of drives.
2 In the tree pane, select a drive.
3 In the content pane, double-click a folder that contains
   the file you want to view.
4 Select the file, then click **File** > **View**.
   The View option is dimmed (unavailable) if you
   selected a program file that has a .exe, .dll, or .com file
   extension.

Restoring Backup Images

6

There are two different methods you can use to restore a computer to full functionality. Each restore method, as described in the table below, takes into account the functionality that is or is not available on the computer. In many instances, you do not need to restart the computer to complete a restoration.

Before you can restore a computer, you must have a backup image already created. You cannot restore the

operating system or data on a computer if a backup image of that drive does not exist.

Problem	Restore method
You can boot into the operating system on the computer but you need to restore a drive (other than the operating system partition) from a recent backup image.	Restore a full backup image. See "Restore a backup image" on page 65. The computer does not require a restart before you can access files.
The computer has one of the following problems: ■ Suffered a catastrophic failure ■ The software cannot lock a drive to perform a restoration directly under Windows ■ You cannot boot into the operating system, and you have lost hardware, data, or program files on a drive	Restore the entire drive using the System Restore Wizard from the recovery environment on the bootable Norton Ghost CD or the Symantec Recovery Disk CD (available with Norton SystemWorks Premier). See one of the following tasks based on your scenario: ■ "Restore a drive using the recovery environment" on page 72. ■ "Restore drives using the recovery environment" on page 75. ■ "Restore drives using a system index file" on page 76. The computer requires a restart before you can access files. ⚠ The recovery environment requires a minimum of 256 MB of RAM to run.

Restore a backup image

If you are able to access the operating system on a troubled computer, you can use the Restore Drive Wizard to restore an entire backup image of a data drive with no rebooting. This method of recovery, known as a hot restore, is useful if you have experienced the complete loss of a data drive.

You can restore a full image or a base image by selecting a .v2i file, or you can select an incremental backup (.iv2i file) that was taken at the point in time to which you want to restore the drive. If you select an incremental backup, the restore process will automatically detect any previous incrementals and the base image associated with that incremental.

Any drive that you restore can be automatically resized smaller to fit the selected destination (assuming the amount of data in the partition does not exceed the size of the destination drive).

For example, if you have a backup image of a 6 GB drive that contains 3 GB of data, and you want to restore the backup to a 4 GB drive, the 6 GB drive being restored is proportionally resized down to 4 GB to fit the destination drive size.

To restore a backup image

1 Do one of the following:
   - In the basic view of Norton Ghost, click **Restore a Drive**.
   - In the advanced view of Norton Ghost, click **Tools > Restore drive**.
2 Click **Next**.

3 Select the backup image file that you are restoring from by selecting one of the following options:

Restore from	Description
Local file	Restores a backup image located on the connected computer. Specify a drive and folder where the backup image is stored. For example, **E:\Data_Backups** To restore a backup image that is located on disc media, browse to the CD or DVD drive and folder where the backup image is located. Make sure the media is in the drive before clicking **Browse**.
Network file	Restores a backup image that is located on the network. Specify a UNC (Universal Naming Convention) path on the network where the backup image is stored, or click Browse to navigate to the network folder where the backup image is stored. For example, **\\computer\share\file** In the Restore Drive Wizard, click **Next**. In the Connect As window, type a domain or computer name, user name, and password, then click **OK** to return to the Wizard.

4 If the backup image is password-protected, type the password in the Password text box, then click **OK**.

5 Click **Next**.

6 In the Restore Destination window, select the destination where you want to restore the backup image file.
If there is not enough free space to restore a backup image file, you can press <Shift> to select multiple, contiguous destinations that exist on the same hard drive.

7 Click **Next**.

8 Set how you want the restore to be performed. Your options are:

Options	Description
Verify image file before restore	Determines whether a backup image file is valid or corrupt before restoring it.
Check for file system errors	Check the restored drive for errors after restoring the backup image file.
Resize drive to fill unallocated space	Automatically expand the drive to occupy the destination drive's remaining unallocated space.
Set drive active (for booting OS)	Makes the restored drive the active partition (the drive the computer boots from).
Partition type	Select one of the following: ■ Primary partition: To restore as a primary partition ■ Logical partition: To restore as a logical partition inside an extended partition
Drive letter	Select a drive letter you want assigned to the partition from the Drive letter drop-down list.

The actual options available are dependent on the restore destination you selected in the previous step.

9 Click **Next** to review the restore options you have selected.

10 Click **Next** to restore the image.

If the Wizard cannot lock the drive to perform the restoration under Windows, it will prompt you to insert the product CD and manually boot into the recovery environment so you can complete the restoration. When

the restore is finished, the computer is restarted automatically.

Restore options

The following options can be set for a restore.

Option	Description
Verify image file before restore	This option is recommended if you want to determine whether a backup image file is valid or corrupt before restoring it. The Wizard checks to see that all of the files in the backup image are available for you to open, the internal data structures in the backup image file match the data that is available, and the backup image file can be uncompressed (if you selected a compression level at the time of creation). If the backup image is invalid, the restoration will not continue.
Check for file system errors	Checks the restored drive for errors after restoring the backup image file.
Resize drive to fill unallocated space	This automatically expands the drive to occupy the destination drive's remaining unallocated space.

Option	Description
Set drive active (for booting OS)	This option makes the restored drive the active partition (the drive the computer boots from). Only one drive can be active at a time. To boot the computer, it must be on the first drive, and it must contain an operating system. When the computer boots, it reads the partition table of the first drive to find out which drive is active and boots from that location. If the drive is not bootable or you are not certain that it is, have a boot disk ready. Set drive active is valid for basic disks only (not dynamic disks).
Partition type	You can set partition type to one of the following: ■ Restore as a primary partition ■ Restore as a logical partition inside an extended partition This option is not applicable for dynamic disks.
Drive letter	Assigns a drive letter to the partition. Available in the Restore Drive Wizard only.

Option	Description
Restore original disk signature	Restores the original physical disk signature of the hard drive. Disk signatures are included in Windows Server 2003, Windows 2000 Advanced Server, and Windows NT Server 4.0 Enterprise Edition (SP3 and later) and are necessary before the hard drive can be used. This option is recommended for advanced users and is available when restoring a whole drive only. Available from the Symantec Recovery Disk CD only.
Restore MBR	Restore the master boot record. The master boot record is contained in the first sector of the first physical hard drive. The MBR consists of a master boot program and a partition table that describes the disk partitions. The master boot program looks at the partition table to see which primary partition is active. It then starts the boot program from the boot sector of the active partition. This option is recommended for advanced users and is available when restoring a whole drive only. Available from the Symantec Recovery Disk CD only.

Boot a computer into the recovery environment

When restoring a computer in the recovery environment you must use the Norton Ghost CD or Symantec Recovery Disk (available with Norton SystemWorks Premier) to first boot into the recovery environment.

The recovery environment requires a minimum of 256 MB of RAM to run.

To boot a computer into the recovery environment

1 If you want to use a USB device while you are running the recovery environment, you must first attach the device, then continue with the next step.

2 Do one of the following:
- Insert the Norton Ghost CD into the media drive of the computer.
- Insert the Symantec Recovery Disk CD (available with Norton SystemWorks Premier) into the media drive of the computer.

3 Immediately restart the computer.
You may need to modify your system to make it bootable from the CD.

4 Watch the computer screen. When the prompt "Press any key to boot from CD" appears, you have approximately five seconds to press a key to begin booting into the recovery environment.

5 If you need to install special RAID or SCSI drivers for the computer's hard disk subsystem, press <F6> when prompted during the boot into the recovery environment.
You should always use the latest Windows XP or Windows 2003 Server version of the particular SCSI driver.

6 Read the license agreement, then click **Accept**.
If you decline, you cannot start the recovery environment and your computer will reboot.

7 If the backup image is located on a network, start networking services by clicking **Yes**. If the backup image is on your local machine, click **No**.

8 In the recovery environment main window, click **Time zone not set**.

9 In the Select Time Zone window, select the time zone location you are in. Setting the correct time zone will help show file dates and times correctly.

Restore a drive using the recovery environment

If you cannot restore a drive while the computer is online (because you cannot boot properly into the OS, for example), you can use the System Restore Wizard from the recovery environment to return a drive on the computer to full functionality.

You can also use the recovery environment to perform a bare metal recovery of a computer if you have suffered a catastrophic hard drive failure.

To restore a single drive

1   Boot the computer into the recovery environment.

2   In the recovery environment main window, click **Advanced Recovery Tasks**.

3   Click **System Restore**.

4   Click **Restore drives**, then click **Next**.

5   In the Restore type window, click **Single drive**, then click **Next**.

6   In the Backup image to Restore window, do one of the following:

- In the Backup image folder and filename text box, type the location of the backup image file you want to restore.

- Click **Browse** and navigate to the backup image file you want to restore that resides on your computer.

- Click **Browse** and in the File name text box, type the name of the computer and share that holds your backup images on a network, then press **Enter**. Select a backup image file you want to restore, then click **Open** to add it to the text field. For example: **\\machine_name\share_name** In the System Restore Wizard, click **Next**. In the Connect As window, type a domain or computer name, user name, and password, then click **OK** to return to the Wizard. If you are still unable to see your network after

typing the computer name and share name, you may need to map a drive to see and browse the network.

7   If the backup image is password-protected, type the password in the Password text box, then click **OK**.

8   Click **Next**.

9   In the Restore Destination window, select the destination where you want to restore the backup image file.
    Some of the drives listed may be invalid selections because there is not enough free space for the restored backup image file or because you do not have rights to the drive.
    If you want to free up disk space, select a drive, then click **Delete Drive**.
    This will free space if a single volume space on the hard drive is not adequate.

When you click **Delete Drive**, the drive is only virtually deleted at that point; the actual deletion of the drive takes place after you click **Finish** in the Wizard.

10 Click **Next**.

11 In the Restore Options window, select or deselect the restore options you want.
    The actual options available will depend on the restore location you selected in the previous step.

Restore Option	Description
Verify backup image before restore	Determines whether a backup image file is valid or corrupt before restoring it.
Check for file system errors after restore	Checks the restored drive for errors after restoring the backup image file.

Restore Option	Description
Resize drive to fill unallocated space	Automatically expands the drive to occupy the destination drive's remaining unallocated space.
Set drive active (for booting OS)	Makes the restored drive the active partition (the drive the computer boots from). ⚠ When restoring an operating system partition to a hard disk that has no other partitions, you must check the box "Set Drive Active (for booting OS)," or the operating system partition will not be active after the restore and will not boot.
Partition type	Select one of the following: ⚏ Primary partition: To restore as a primary partition ⚏ Logical partition: To restore as a logical partition inside an extended partition
Restore original disk signature	Restores the original physical disk signature of the hard drive.
Restore MBR	Restores the master boot record.

12 Click **Next** to review the system restore options you have selected.

13 In the System Restore Wizard window, select **Reboot after finish** if you want the computer to reboot automatically after the backup image is restored.

14 Click **Finish**.

15 Click **Yes** to start restoring the backup image.

Restore drives using the recovery environment

You can use the System Restore Wizard from the recovery environment to restore an entire computer that may have more than one drive.

You can also use the recovery environment to perform a bare metal recovery of a computer if you have suffered a catastrophic hard drive failure.

To restore multiple drives

1 Boot the computer into the recovery environment.

2 In the recovery environment main window, click **Advanced Recovery Tasks**.

3 Click **System Restore**.

4 Click **Restore drives**, then click **Next**.

5 In the Restore type window, click **Multiple drives**, then click **Next**.

6 In the Backup images to restore window, do one of the following:
   - Add a backup image file
   - Edit a backup image file
   - Remove a backup image filename

7 In the Backup Images to Restore window, select **Reboot after finish** if you want the computer to reboot automatically after the backup images are restored.

8 Click **Finish** .

9 Click **Yes** to start restoring the backup images.

Add, edit, and remove image files

To add a backup image file

1 In the Backup images to restore window, click **Add**, then specify the location of the backup image file.

2 Click **Next**.

3 In the Restore Destination window, select the destination where you want to restore the backup image file.
Some of the drives listed may be invalid selections because there is not enough free space for the restored backup image file or because you do not have rights to the drive.

4 If you want to free up disk space, select a drive, then click **Delete Drive**.
Deleting drives lets you select the space previously used by more than one drive. This will free space if no single drive is adequate.

When you click **Delete Drive**, the drive is only virtually deleted at that point; the actual deletion of the drive takes place after you click **Finish** in the Wizard.

5 Click **Next**.

6 Select or deselect the restore options you want.

To edit the list of backup images

1 In the Backup images to restore window, select a filename from the list of backup images you are restoring.

2 Click **Change**.

3 Do one of the following:
   - Specify a new path to the backup image
   - Select a new backup image filename
   - Select a new restore destination
   - Select new restore options

To remove a filename from the list of backup images

1 In the Backup images to restore window, select a backup image filename.

2 Click **Remove**.

Restore drives using a system index file

You can use the System Restore Wizard from the recovery environment to restore an entire computer that

may have more than one drive. This type of restore uses a system index file (.sv2i) to reduce the amount of time needed to restore the drives. Each time a backup image is created, a system index file is saved along with it. The system index file contains a list of the most recent backup image files including the original drive location of each backup image file.

You can also use the recovery environment to perform a bare metal recovery of a computer if you have suffered a catastrophic hard drive failure.

To restore multiple drives using a system index file

1 Boot the computer into the recovery environment.

2 In the recovery environment main window, click **Advanced Recovery Tasks**.

3 Click **System Restore**.

4 Click **Restore drives**, then click **Next**.

5 In the Restore Type window, click **Multiple drives using system index file (*.sv2i)**, then click **Next**.

6 In the System Index File window, do one of the following:

- Type the full path to the system index file (*.sv2i).

- Click **Browse** to navigate to the system index file. The system index file is in the same location as the backup image file you want to restore.

7 Click **Next**.

8 In the Backup Images to Restore window, do one of the following:

- Select the filenames of the backup images you want to restore from the list box. By default all backup images are selected.

- Add, edit, or remove backup image files.

- Select **Reboot after finish** if you want the computer to reboot automatically after the backup images are restored.

9 Click **Finish**.

10 Click **Yes** to start restoring the backup images.

Using the support utilities

When you are running under the recovery environment, there are several support utilities available that you can run to troubleshoot networking or hardware issues you may encounter. For example, you can ping a computer, renew IP addresses, or get information about a hard drive partition table.

Symantec Technical Support may require information generated by these utilities if you call Symantec for help resolving problems.

To use the support utilities

1   In the recovery environment main window, click **Advanced Recovery Tasks**.

2   Click **Utilities**.

3   Click the support utility you want to run.

Support Utility Option	Description
Start Networking Services	Loads the necessary network drivers on your computer so you can access network-stored backup image files.
Map Network Drive	See "Network connectivity during a restore" on page 82.
Configure IP Address	See "Getting a static IP address" on page 84.
Ping Remote Computer	Use Ping to see if a computer you want to back up is operating and to see if the network connections to that computer are intact and functioning. Type the IP address of the computer you want to check, then click **OK**.

Support Utility Option	Description
Edit boot.ini	See "Edit the boot.ini file" on page 83.
Display SME Disk Information	Use to view, among other things, information about the hard drive on the computer.

You can save the information to a text file (SMEDUMP.TXT) which can then be sent to technical support, if necessary. |
| View Partition Information | Use PartitionInfo to create a report of the contents of your hard drive partition table. This report can help you diagnose and fix various disk partition problems.

You can save the information to a text file, which can then be sent to technical support, if necessary. |

Support Utility Option	Description
Edit Partition Table	Use PTEdit to read and allow manipulation of the partition table information found in the Master Boot Record and EPBR Boot record. PTEdit is useful for fixing partition table errors or boot sector problems.
	You can make changes to partition tables by using decimal values rather than hex values. You can also change the file system flag, set the active partition, hide and unhide partitions, and change CHS values, boot sector information, and the number of sectors in a partition. When you change the number of sectors, the final result must match the CHS values.
	PTEdit looks at partition table information in a relative fashion. Basically it finds the start sector of a primary partition by calculating the absolute value of the sector from the start of the drive to the boot sector of the partition.

Support Utility Option	Description
Change Active Partition	Use PQBoot to easily and quickly switch between bootable primary partitions. PQBoot is for users who only occasionally need to change the active partition. Type the ID number of the partition (shown in the first column) you want to make the bootable primary partition, then press <Enter>. PQBoot makes the partition active and reboots the computer.
Restore Master Boot Record	Use to save or restore critical MBR (Master Boot Record) information in the first sector of a hard drive. The contents of the first sector or entire first head of the hard drive are saved or restored to a file.

Recovery environment troubleshooting

Use the following information to help you perform restorations from the recovery environment or to solve issues you may experience while restoring a backup image from the recovery environment.

- How does the recovery environment work?
- Run USB devices
- Network connectivity during a restore
- Getting a static IP address
- Using a delayed apply with no DHCP

How does the recovery environment work?

Occasionally, a computer failure can leave the operating system intact but you cannot restore a backup image with just a reboot. Or sometimes a computer failure has

made the operating system entirely inoperative, making a restoration seemingly impossible. For these types of situations, you simply reboot the computer using the Norton Ghost 9.0 CD or the Symantec Recovery Disk CD (available with Norton SystemWorks Premier). The computer automatically boots into the recovery environment and lets you run (among other things) the System Restore Wizard (to restore a backup image) or the Backup Image Browser (to perform a file-level restore).

The recovery environment makes restoring backup images possible under almost any computer disaster. Following the restoration of a backup image, the computer is automatically rebooted and restored to its previous, usable state.

Run USB devices

To enable a USB device while you are running from the recovery environment, you must first attach the device, then boot the computer into the recovery environment.

Network connectivity during a restore

The following information only applies if you started networking when you booted into the recovery environment.

If you attempt to boot directly into the recovery environment when there is no DHCP server (or the DHCP server is down), you will be prompted to enter a static IP address and a subnet mask address for the computer on which you are running the recovery environment.

After the static IP address and subnet mask address are correctly entered, you will be able to enter the recovery environment. However, because there is no way to resolve computer names, when you run the System Restore Wizard or the Backup Image Browser, you will only be able to browse the network using an IP address to locate a backup image file.

To map a network drive

1   In the recovery environment main window, click **Advanced Recovery Tasks**.
2   Click **Utilities**.
3   Click **Map Network Drive**.
4   Map a network drive using a UNC path of the computer where the backup image file is located. For example,
    \\machine_name\share_name or
    \\IP_address\share_name)

You will now be able to browse to that drive mapping and select a backup image file that you want to restore.

Edit the boot.ini file

If necessary, you can edit the boot.ini directly from the recovery environment. The boot.ini is a Microsoft initialization file that is found at the root directory of your primary boot partition (usually the C:\ partition). The file is used by Microsoft Windows to display a menu of operating systems that are currently installed on a computer. You can then select which operating system to boot. The boot.ini is also used to point to the locations of each operating system on the computer.

For more information about editing the boot.ini file under a particular Windows operating system, refer to the following Microsoft Knowledge Base article IDs on microsoft.com:

  ▪ 289022 (for Windows XP)
  ▪ 311578 (for Windows 2000)

To edit the boot.ini file

1   In the recovery environment main window, click **Advanced Recovery Tasks**.
2   Click **Utilities**.
3   Click **Edit Boot.ini File** to open the file in a plain text editor.
4   Make the changes you want and save the file.

Getting a static IP address

If you are trying to restore a backup image that is located on a network drive/share, but you are unable to map a drive or browse to the drive/share on the network (usually caused by the lack of an available DHCP service), you can assign a unique static IP address to the computer that is running the recovery environment. You can then map to the network drive/share.

The Network Configuration dialog is automatically displayed if there is no DHCP service available when you start the recovery environment. However, if it does not display you can open it from the recovery environment.

To display the Network Configuration window

1   In the recovery environment main window, click **Advanced Recovery Tasks**.
2   Click **Utilities**.
3   Click **Network Configuration**.

To get a static IP address

1   In the list box of the Network Configuration window, select **IP #1**.
2   Click **Modify**.
3   Specify a unique IP address and subnet mask for the computer you are restoring. Be sure that the subnet mask matches the subnet mask of the network segment.
4   Click **OK** twice to return to the recovery environment main window.
5   Click **Advanced Recovery Tasks** > **Utilities** > **Ping Remote Computer**.
6   Specify the address of a computer you want to ping on the network segment using one of the following

formats. (Usually it will be the computer that holds the backup image you want to restore.)

Address Method	Description
Computer name	Specify a computer name if you use the domain or workgroup to resolve computer names. For example, **computersb**
Computer name and domain	Specify a computer name and domain if you are using an Active Directory domain to resolve computer names. For example, **computersb.domain.com**
IP address	Specify an IP address if there is no computer name resolution available on the segment. For example, **12.345.678.9**

7 Click **OK**.

If you specified a computer name or computer name and domain as the address method (as described in the table above), make note of the IP address that is returned from the computer you are pinging.

If communication to the computer is operating as expected, you can use the Map Network Drive utility to map a drive to the backup image location.

To get an IP address if the ping is unsuccessful

1 On the computer that holds the backup image you are wanting to restore, at a DOS prompt, type **ipconfig/all** and press <Enter>.

2 Write down the IP address that is displayed.

3 Return to the computer that is running the recovery environment and run Ping Remote Computer using the IP address you wrote down.

To map a network drive

1. In the recovery environment main window, click **Advanced Recovery Tasks** > **Utilities** > **Map Network Drive**.
2. In the Drive drop-down list, select a drive letter.
3. In the Folder text box, type the IP address of the storage computer and the share where the backup image is located.
   For example: **\\IP.address\share_name**
4. Click **Connect using a different user name**.
5. In the User name text box, type the IP address and username.
   For example: **IP.address\user_name**
6. In the Password text box, type the username password.
7. Click **OK**.

You should now have a drive mapped to the backup image location on the storage computer.

Using a delayed apply with no DHCP

If there is no DHCP service available and you have stored your backup images to a network drive, a delayed apply will not work because the computer name cannot be resolved. The recovery environment has only limited support for DHCP and DNS.

To work around this issue, you can boot directly into the recovery environment and restore the backup image from there instead of using delayed apply.

Copying Drives

7

You can copy the contents of one hard drive to another. You can copy your operating system, applications, and data to a new hard drive. If the hard drive you are copying contains more than one partition, you must copy the partitions one at a time to the new hard drive.

You can use the Copy Drives feature when you upgrade to a larger hard drive or when you add a second hard drive and keep the original. You should not use the Copy Drives feature to set up a hard drive that will be used in another computer.

Before using the Copy Drive feature

Before you can copy drives, you must have the hardware configured correctly as follows:

🔳 Prepare the computer. Get the manufacturer's directions for installing the drive. Shut down the computer, and disconnect the power cord. Discharge

electricity by touching a grounded metal object. Remove the computer cover.

- Change the hard drive jumper settings to make the new hard drive the slave drive, or connect it as the slave drive if you are using cable select instead of jumper settings to determine the master and slave drives.
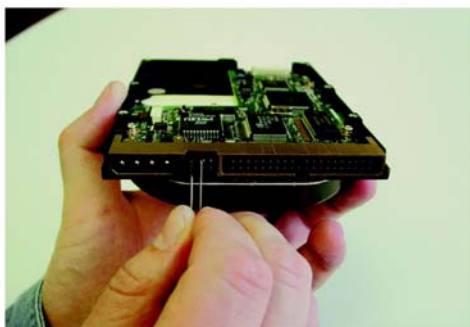
- Attach the new hard drive. Connect the cable so the colored stripe on the edge lines up with the I/O pins on the motherboard. The motherboard is marked Pin1 or 1 where the colored stripe should go. Next connect the other end of the cable to the back of the hard drive, again matching the striped edge with the I/O

pin position on the drive itself. The I/O pin is usually on the side closest to the power supply.

■ Attach the power connector to the new hard drive. There is only one way to connect the power cable—do not force it. Make sure the angled edge of the plastic connector lines up with the angled edge of the pin socket.
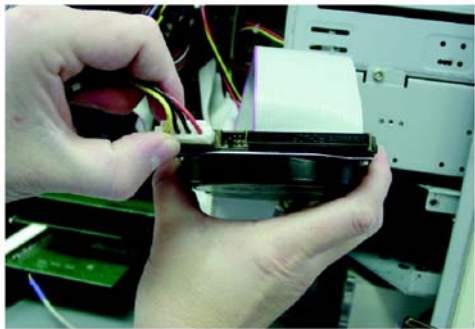
◼ Anchor the drive in the bay area according to the manufacturer's instructions for the computer or the computer bay requirements.

◼ Change the BIOS to recognize the new hard drive. To change the BIOS settings, watch the bottom of the screen while your computer is starting up. Press <Del>, <F1>, <F2>, or <F10> according to the legend that appears. Select Auto Detect for both the master and slave drives. Save the BIOS changes and exit. Your computer will restart automatically.

Copy one hard drive to another hard drive

When you have your new hard drive installed, you are ready to copy your old hard drive to the new one. The new hard drive does not need to be formatted.

If the hard drive you are copying contains more than one partition (for example, a C:\ drive, a D:\drive, an E:\ drive, and so forth), you must copy each partition, one at a time, to the new hard drive.

If the power or other hardware fails when you are copying data, no data is lost from the source drive. Should the power or other hardware fail, just start the process again after the failure is resolved.

To copy one hard drive to another

1   On the menu bar of Norton Ghost, click **Tools** > **Copy Drive**.

2   Follow the instructions in the Wizard to copy the drive.

The Wizard will guide you through selecting the right drive to copy, the destination drive, and the options for copying the data from one drive to another.

Copy Drive Wizard options

As part of copying a drive from one hard drive to another, your options are:

Option	Description
Check source for file system errors	Check the source (original) drive for errors before copying it.
Check destination for file system errors	Check the destination (new) drive for errors after copying the drive.
Resize drive to fill unallocated space	Automatically expand the drive to occupy the destination drive's remaining unallocated space.

Option	Description
Set drive active (for starting OS)	Make the destination drive the active partition (the drive the computer starts from). Only one drive can be active at a time. To start the computer, it must be on the first drive, and it must contain an operating system. When the computer starts, it reads the partition table of the first drive to find out which drive is active and starts from that location. If the drive is not bootable or you are not certain that it is, have a boot disk ready. Set drive active is valid for basic disks only (not dynamic disks).
Disable SmartSector copying	Symantec's SmartSector® technology speeds up the copying process by only copying clusters and sectors that contain data. However, in some cases, such as high-security environments, it may be desirable to copy all clusters and sectors in their original layout, whether or not they contain data. To copy both used and unused sectors, click this option. Disabling SmartSector copying increases copying time.
Ignore bad sectors during copy	Copy the drive even if there are errors on the disk. (However, if there are too many errors that cannot be ignored, Ghost will not perform the copy.)

Option	Description
Destination partition type	Click **Primary partition** to make the destination (new) drive a primary partition. Click **Logical partition** to make the destination (new) drive a logical partition inside an extended partition.
Drive letter	Select a drive letter you want assigned to the partition from the Drive letter drop-down list.
Copy MBR	Copy the master boot record from the source drive to the destination drive. Select this option if you are copying the C:\ drive to a new, empty hard drive. You should not select this option if you are copying a drive to another space on the same hard drive as a backup or if you are copying the drive to a hard drive with existing partitions that you will not be replacing. Additionally, if you are copying multiple drives to a new, empty hard drive, you only need to select this option once.

Restart the computer after copying drives

After you have copied the old hard drive to the new hard drive, do the following:

- You can remove the old hard drive or keep it as a slave drive.

⊞ Change jumper settings to make the new hard drive the master drive before restarting the computer.

Troubleshooting

A

If you need more information about resolving a problem, please check the Symantec web site.

You should also see the Readme.txt file on the product CD which also includes valuable troubleshooting information beyond what is included in this section.

For more information, select one of the subentries for this Help topic.

Explore the Symantec service and support web site

On the Symantec service and support Web site, you can find the latest protection and program updates, patches, online tutorials, Knowledge Base articles, error codes, and virus removal tools.

To explore the Symantec service and support Web site

1   On the Internet, go to www.symantec.com/techsupp
2   On the service and support Web page, under the heading home & home office/small business, click **Continue**.
3   Follow the links to the information that you want.

If you cannot find what you are looking for using the links on the introduction page, try searching the web site.

To search the Symantec service and support Web site

1   On the left side of any Symantec Web site page, click **search**.

2   On the search page, type a word or phrase that best represents the information for which you are looking. Use the following guidelines when searching the Symantec Web site:

-   Type a single word in lowercase letters to find all occurrences of the word, including partial matches. For example, type **install** to find articles that include the word install, installation, installing, and so on.

-   Type multiple words to find all occurrences of any of the words. For example, type **virus definitions** to find articles that include virus or definitions or both.

-   Type a phrase enclosed in quotation marks to find articles that include this exact phrase.

-   Type a plus (+) sign in front of all of the search terms to retrieve documents containing all of the words. For example, **+Internet +Security** finds articles containing both words.

-   For an exact match, type the search words in uppercase letters.

-   To search for multiple phrases, enclose each phrase in quotation marks and use commas to separate the phrases. For example, "purchase product", "MAC", "Norton SystemWorks" searches for all three phrases, and finds all articles that include any of these phrases.

3   Select the area of the Web site that you want to search.

4   Click **Search**.

Troubleshooting Norton Ghost

Check this section for possible solutions to issues that might arise with Norton Ghost.

Installation troubleshooting

If you have problems installing Norton Ghost, you might find a solution here.

I just tried to run the console and I got an error that the dynamic link library mscoree.dll could not be found in the specified path.

You are getting this error because the Microsoft .NET Framework is not installed on the computer where the console is installed. To fix this issue, run the Ghost installation on the Norton Ghost CD (or the Norton SystemWorks Premier CD) and you will be prompted to install the .NET Framework 1.1. When the .NET Framework is installed, you will be able to run the management console with no errors.

I don't know the system information that I'm required to enter.

You can get system information directly from Windows. This information can be used to specify an IP address, drivers, and so forth when installing the Symantec product or setting up the recovery environment.

To get system information from Windows

❖ On the Windows taskbar, click **Start** > **Programs** > **Accessories** > **System Tools** > **System Information**.

Use the tree pane area to select the information group you want to view or print.

Drive letter changes

If the drive letter of the CD drive has changed since you installed the product, you will get an error message (the MSI file cannot be found) when you run the "Repair" or "Modify" installation option from the Norton Ghost CD. This error typically occurs if you are adding or removing

external devices to a desktop PC or internal devices to a laptop.

To avoid this issue, make sure that Windows "sees" the CD drive as the same drive letter as when Norton Ghost was first installed.

Which version of Microsoft .NET Framework do I install?

If you have Microsoft .NET Framework 1.1 already installed, version 1.1 will not be installed from the Norton Ghost CD.

If you skip the 1.1 installation on the Norton Ghost CD, you will need to download and install the Microsoft .NET Framework 1.1 from the Microsoft Web site prior to using Norton Ghost.

Backup image troubleshooting

Check here for suggestions to help resolve problems that are encountered while creating backup images.

Backup images on CD

■ Difficulties with creating backup images to CD may be resolved by downloading the latest CD or DVD drivers and firmware updates from the manufacturer of your CD or DVD writer.
When you have completed the update, be sure you turn off the power to the computer (if your CD/DVD burner is internal), then turn the power back on. This will ensure the computer recognizes the drive. If your CD/DVD burner is external, unplug the power source to the burner, then plug it back in.

■ If you create a backup image of two drives and the first backup image fills one and a half CDs, you will be prompted to insert new media before the second drive is backed up. It helps to think of the two drives as two separate backup sets. This process makes it easier to restore backup images from removable media later.

Support for CD/DVD burners

Check the Symantec web site to make sure that your CD/DVD burner is supported. Supported burners allow variable packet writing, a necessary feature if you are writing a backup image to CD or DVD. Most burners manufactured since 1998 support variable packet writing. If your burner is not listed, you should check your burner's documentation to see if variable packet writing is supported before you attempt to write backup images to it.

DVD-ROM drives

Some DVD-ROM drives cannot play DVD+R media. If you plan to create a backup on DVD+R media and later restore from a DVD-ROM drive, you should check the drive compatibility list at the following URL:

http://www.dvdplusrw.org/

Scheduled backup image troubleshooting

Check here for suggestions to help resolve problems that are encountered while scheduling backup jobs.

I created a backup job and set a number of full backups that I wanted to maintain on the hard disk. After a while, backups stopped being created.

When you create a backup job, you can specify the number of backup images you want to save on the hard disk before they are rotated out and deleted. When you use this option you must also make sure that you have enough hard disk space to accommodate the number of backup images you specify, *plus* one additional backup image. If you run out of hard disk space before the number of specified backup images is reached, the recurring backup image process will no longer function and a current backup image will not be created. The solution is to either reduce the number of recurring backup images you are creating, or increase the amount

of space necessary to maintain the number of backup images you specify.

You should also check the Events tab in the advanced view of Norton Ghost to find the problem.

Check the status of the agent

If you have problems with the agent you might find a solution here.

To check the status of the agent

1 On the Windows taskbar, click **Start** > **Run**.
2 In the Open text box, type **services.msc**.
3 Click **OK**.
4 In the Name column, select Norton Ghost. The Status column for Norton Ghost (you may need to scroll to the right to see the column) should have "Started" listed.
5 Do one of the following:
   - ◾ To stop the service, in the Name column, right-click **Norton Ghost**, then click **Stop**.
   - ◾ To start the service, in the Name column, right-click **Norton Ghost**, then click **Start**.

I want to test the scheduling of my backup images.

To test the scheduling of backup images, you can stop the Norton Ghost agent service in the Microsoft Services console (SERVICES.MSC), change the date forward on the computer to a time when a scheduled backup image should occur, then restart the Norton Ghost service. If the date is changed while the service is running, the change will not be noticed by the Norton Ghost service.

I deleted a drive and now I get backup job errors

If you delete a drive, you should also delete any backup jobs associated with that drive. Otherwise, the backup jobs will attempt to run on the deleted drive, resulting in errors every time.

Restore backup images from Windows troubleshooting

Check here for suggestions to help resolve problems that are encountered while restoring backup images from Windows.

Restore from a backup image that is spanned

- When you restore a system drive under Windows from the console and the backup image is on spanned CDs, the console will not prompt correctly for the next media. To avoid this problem, restore the backup manually from the System Restore Wizard in the recovery environment.

- When you are restoring from CD, you are prompted to insert the first CD, followed by the last CD, the first CD, the last CD, then the first CD again. Then the restore begins and prompts you for the media in sequence. After restoring a backup image, you will be prompted again to insert the first CD one more time. For example, if you had a backup image that spanned across five CDs, the order you would insert the CDs would be as follows: 1-5-1-5-1-2-3-4-5-1.

Restore a system drive

- If you began restoring a backup of a system drive under Windows and encounter an error, you will have to boot into the recovery environment and start the System Restore Wizard to manually restore the backup.

- When you restore a system drive under Windows, the restore may not complete successfully if the recovery environment assigns different letters to drives other than what was assigned under Windows. This discrepancy is sometimes caused by USB and FireWire devices or CD devices, or if you have manually changed drive letter assignments. (Under Windows fixed drives are assigned first; under the recovery environment, removable drives are assigned first.) The work-around is to restore the backup

manually from the recovery environment using the System Restore Wizard.

Recovery environment troubleshooting

Check here for suggestions to help resolve problems that are encountered while running Symantec Recovery Disk.

You should also see the Readme.txt file on the product CD which also includes valuable troubleshooting information beyond what is included in this section.

I can't boot the computer from the CD

To run the recovery environment, you must be able to boot your computer from the Norton Ghost CD or the Symantec Recovery Disk CD (available with Norton SystemWorks Premier).

To boot your computer from the product CD

1 Turn on your computer.
2 While the computer is starting, watch for a prompt that tells you how to access the BIOS. Generally, you will need to press <Del>, <F1>, <F2>, or <F10>.
3 From the BIOS screen, choose the Boot menu. The boot devices will be listed.
4 Change the CD or DVD drive to be the first boot device in the list.

5 Save the changes and exit the BIOS setup. When you boot your computer with the product CD in the drive, you will see a prompt telling you to press any key to boot from CD. If you do not press a key, your computer will attempt to boot from the next boot devices listed in the BIOS. There is only a short delay when the prompt to press a key is displayed, so you need to watch carefully as the computer starts.
6 Press a key, and the recovery environment will start.

I cannot access the local drive where my backups are saved.

You may need to load drivers for the storage device where your backups are saved as part of booting to the recovery environment.

To access the local drive

1 Boot your computer using the Norton Ghost CD or the Symantec Recovery Disk CD (available with Norton SystemWorks Premier).

See **"Supported storage devices and NIC drivers"** on page 103.

2 When you see the prompt "Press any key to boot from CD" immediately press **<F6>**.
   If you press a different key, you will not have an opportunity to load special drivers.
   By pressing F6, you can add storage drivers for most SCSI devices listed at:
   www.microsoft.com/windows/catalog.

3 Press **<S>** when prompted to specify additional SCSI adapters, CD drives, or special controllers for use with Windows, including those for which you have a device support disk from a mass storage device manufacturer.

If you do not have the drivers available from the device manufacturer and they are not included as part of the recovery environment, you will not be able to use that drive.

I can't access the network drive where my backups are saved.

See **"Supported storage devices and NIC drivers"** on page 103.

The system where you are running the recovery environment may use a NIC driver that is not included as part of the recovery environment. Please contact Symantec Services and Support if your NIC is not detected by the recovery environment.

Supported storage devices and NIC drivers

For a list of storage devices and NIC drivers that are supported by the recovery environment, please see www.symantec.com or see Drive_List.PDF on the product CD.

If your storage device is not listed, you can press <F6> when booting a computer into the recovery environment and manually load the necessary drivers.

If your NIC card is not listed and the recovery environment does not detect the driver, contact technical support.

My backup is on CD but I can't use the drive because the Norton Ghost CD is running the recovery environment.

When you restore a backup from a CD or DVD from within the recovery environment and you only have one CD or DVD drive, you must leave the product CD in that drive until *after* you have clicked **Browse** to locate the backup. After the Open dialog box has displayed, you can remove the Norton Ghost CD or the Symantec Recovery Disk CD (available with Norton SystemWorks Premier) and insert the media that contains the backup.

If you remove the product CD before clicking **Browse**, the recovery environment will exit back to the recovery environment main window.

Error messages

If the information you need is not included in this section of the documentation, please visit the Symantec web site for additional information.

Backup Image Browser

Check here for suggestions to help resolve error messages that are encountered while running the Backup Image Browser.

Cannot initialize COM library

The product was unable to initialize the COM subsystem. This can be caused by insufficient resources or corrupt DLLs. Reboot the system, and try to free system resources.

Cannot allocate Norton Ghost mount manager instance

The product was unable to allocate resources for the Symantec mount manager. This error is usually reported when the product is partially installed or some of the product's COM objects are missing or incorrectly registered. To correct this condition, reinstall the product.

Cannot retrieve drive information

The Symantec mount manager did not recognize the drive as a mounted backup image. This error is most commonly reported when another process is attempting to dismount the drive. The error may also occur if the drive is corrupt. Close all Symantec products, and retry the dismount operation. If the problem persists, reboot the computer to allow Windows to re-enumerate all mounted drives.

Cannot dismount drive. Please verify the drive is not locked by another process

The Symantec mount manager was unable to dismount the drive. To resolve the error, make sure there are no open files on the drive and that the drive is not locked by another application.

General error messages

If you receive an error message you may find the solution here. Otherwise, check the Symantec web site using the generated error code.

Error EC8A0001:The engine has not been initialized

This error is caused by updated firmware on QLogic drives conflicting with the QLogic driver on the product CD. In other cases it could also be caused by any SCSI conflict with particular drivers on the product CD.

Try loading the driver manually.

If the error continues contact technical support with an SMEdump file, PARTINFO file, and system information file (if available). Additional log files may also be needed.

Error E0BC000A

The saved initial state for applying changes does not match the current system state. You should try restoring under the recovery environment.

Error EBAB001A

Cannot read data from drive. An unknown exception has occurred.

This error is reported when you are attempting to save a backup image to a SAN drive or removable media, or when you are attempting to restore a backup image from the recovery environment.

If you are saving a backup image to a SAN drive, check Disk Management for missing or old volumes. If you are saving a backup image to removable media, insert disks into the drive. If that does not work, disconnect the removable media drive. Remove attached USB devices.

Error E0B000C

This error may also display one of the following:

- Object BasicDisk SME~Computer~BgM896453 was in the saved state but is not in the current state.
- Object MediaCommon:Sme~computer ~Pd1~M896453 was in the saved state but is not in the state.

These two error messages could be caused by changes to the serial number. It could also be caused by the drive information reporting differently.

If the restore was initially set up in Windows, but the entire system was rebooted with the product CD, try going through the System Restore Wizard in the recovery environment on the product CD. There could be a change

in the drive information in Windows 2000 compare to the recovery environment. If the error continues to occur during the use of the System Restore Wizard from the recovery environment, you should contact technical support.

Error E0710007

Cannot create a virtual volume image

Contact technical support. You will need SME disk information, PARTINFO file, and system information file (technical support can help you obtain this information). Additional log files may also be needed.

Catastrophic error

This may be caused by a conflict with another program. Contact technical support.

WinBOM error when booting from recovery environment

This is an issue with the NIC (Network Interface Card) driver not loading. If the backup image you want to restore is located on the network, you should first try a different NIC card. If that is usuccessful, you will need to send the drivers and a system information file to technical support.

The month and year are reversed on some international computers

This is an issue with some international servers. Send the .PQH files to technical support.

Getting help for volumes on Windows

For more information about basic and dynamic volumes, see the Microsoft Disk Management Help file (DISKMGMT.CHM). The default location for this Microsoft help file is \WINNT\HELP (under Windows 2000 Advanced, 2000, or NT 4), or \WINDOWS\HELP

(under Windows 2000 Professional or Windows XP
Professional).

Norton Ghost agent and Windows Services

The Norton Ghost agent runs as a service rather than as a
desktop application. Running the agent as a service
allows scheduled backup jobs to run even if no one (or an
unprivileged user) is logged on to the computer.

Because the agent runs as a service, you can use the
Services tool in Windows if you ever need to start, stop,
configure the password, or troubleshoot the agent.
Checking the agent in Services can be an invaluable tool
to solving a problem with the software. If the agent is not
starting on a computer, you will have problems creating
and restoring backups.

Using the Services tool, you can manage the agent in the
following ways:

Start, stop, or disable the agent on local and remote computers.	See "Start, Stop, or Restart the agent service" on page 111.
Configure the username and password used by the agent.	See "Add users who can back up a computer" on page 48.
Set up recovery actions to take place if the agent fails to start.	For example, you can restart the agent automatically or restart the computer (on computers running Windows XP or Windows 2000 only). See "Set up recovery actions when the agent fails to start" on page 112.

Viewing the status of a agent

There are several methods you can use to open Services
to view the status of the agent. Use the method that is
most convenient for you.

To view the status of the agent

1 On the Windows taskbar, do one of the following:
- Click **Start** > Settings > **Control Panel** > **Administrative Tools** > **Services**.
- Click **Start** > **Run**. In the Open text field, type **services.msc**, then click **OK**.
- If you are running Windows XP, click **Start** > **Control Panel** > **Performance and Maintenance** > **Administrative Tools**, then double-click **Services**.

2 Scroll the list of services until you see Norton Ghost (the name of the agent) under the Name column. Its status should be set as Started.

Best practices for using services

The agent service is a critical component for creating backup images. To minimize problems with the agent, there are a number of steps you can take.

The following table lists various tasks that you should check or use.

Check the Events tab first before using Services.	The Events tab should be the first place you check when tracking down the source of a problem, particularly when it is associated with the agent. Selecting the most recent log entries in the Events tab will often give you information and clues as to what is causing the problem.
Verify that the agent is starting without user intervention.	When the agent is installed on a computer it is configured to start automatically when the console starts. You may want to test this by opening the console to verify that the agent can start without user intervention (the Status area in the Task pane of the console will say "Ready" when the agent has successfully started). You can also test that the agent is starting automatically by looking in Services and checking the status and restarting the service if necessary. If the Startup type is set to automatic, you should try starting the agent again (see "Start, Stop, or Restart the agent service" on page 111).
Use caution when changing default settings for the agent.	Changing the default settings for services might prevent key services from running correctly. It is especially important to use caution when changing the Startup Type and Log On As settings of services that are configured to start automatically. Changing the default agent properties may prevent the console from running correctly. In particular, you should use caution when changing the default Startup type and Log On settings of the agent since it is configured to start and (typically) log on automatically when you open the console.

Start, Stop, or Restart the agent service

To start, stop, or restart the agent service, you must be logged on as an administrator. If your computer is connected to a network, network policy settings may also prevent you from completing this task.

Some instances of when you may need to start, stop, or restart the agent service include the following:

Start or Restart	If the console is unable to connect to the agent on a computer or you cannot reconnect from the console by clicking Reconnect in the Task pane.
Restart	You have just changed the username or password (or both) you use to log on to the agent service, or you used the Security Configuration Tool to give additional users the ability to back up computers. See "Add users who can back up a computer" on page 48.)
Stop	If you believe the agent may be causing a problem on the computer or you want to temporarily free memory resources. If you have created a backup job, note that stopping the agent will prevent backup images from being created at the scheduled times you specified.

To start, stop, or restart the Agent

1   In the Services window, select Norton Ghost under the Name column.

2   Do one of the following:

Action	Description
Click **Action > Start**	Starts the agent
Click **Action > Stop**	Stops the agent
Click **Action > Restart**	Restarts the agent

Stopping the agent service will prevent you from creating or restoring backups from the console.

If you stop the agent service, then start the console, the agent will restart automatically and the Status in the Task pane of the console will indicate that it is "Ready" to perform a task.

If you stop the agent service while the console is open, you will receive an error message and the console will be disconnected from the agent. In most cases, you can click Reconnect from the Task pane of the console to restart the agent.

Set up recovery actions when the agent fails to start

You can specify the computer's response if the agent fails to start. Recovery actions are available only on target computers that are running Windows 2000 or Windows XP.

To set up recovery actions

1 In the Services window, select Norton Ghost under the Name column.

2 Click **Action** > **Properties**.

3 Click **Recovery**.

4 In the First failure, Second failure, and Subsequent failure drop-down list, select one of the following actions:

Option	Description
Restart the Service	Specify the number of minutes to pass before an attempt to restart the service is made.

Option	Description
Run a Program	Specify a program to run. You should not specify any programs or scripts that require user input.
Restart the Computer	Specify how long to wait before restarting the computer by clicking Restart Computer Options. You can also create a message that you want to display to remote users before the computer restarts.

5 In the **Reset fail count after** text box, specify the number of days that the agent must run successfully before the fail count is reset to zero.
When the fail count is reset to zero, the next failure triggers the action set for the first recovery attempt. If you want the agent to run correctly for several weeks between failures, you should specify a large number.

6 Click **OK**.

Viewing agent dependencies

The agent depends on other required services to run properly. If a system component is stopped or is not running properly, dependent services can be affected.

An instance of when you would want to view the agent dependencies is if the agent fails to start; check the dependencies to ensure they are installed and that their Startup type (as identified in the General tab) is *not* set to Disabled.

To view agent dependencies

1 In the Services window, select Norton Ghost under the Name column.

2 Click **Action** > **Properties**.

3 Click **Dependencies**.

The top list box on the Dependencies tab displays services that are required by the agent to run properly.

The bottom list box does not have any services that need the agent to run properly.

The following table lists the three services that are required by the Norton Ghost agent to run properly, along with their default Startup type setting (as listed in the General tab).

Service	Startup Type
Event Log	Automatic
Logical Disk Manager	Automatic
Remote Procedure Call (RPC)	Automatic

Service and support solutions

B

The Service & Support Web site at http://service.symantec.com supports Symantec products. Customer Service helps with nontechnical issues such as orders, upgrades, replacements, and rebates. Technical Support helps with technical issues such as installing, configuring, or troubleshooting Symantec products.

Methods of technical support and customer service can vary by region. For information on support offerings in your region, check the appropriate Web site listed in the sections that follow.

If you received this product when you purchased your computer, your computer manufacturer may be responsible for providing your support.

Customer service

The Service & Support Web site at http://service.symantec.com tells you how to:

- Subscribe to Symantec newsletters.
- Locate resellers and consultants in your area.
- Update your product registration.
- Find out about orders, returns, or a rebate status.
- Access Customer Service FAQs.
- Post a question to a Customer Service representative.
- Obtain product information, literature, or trialware.

For upgrade orders, visit the Symantec Store at:
http://www.symantecstore.com

Technical support

Symantec offers two technical support options for help
with installing, configuring, or troubleshooting Symantec
products:

■■ Online Service and Support
Connect to the Symantec Service & Support Web site
at http://service.symantec.com, select your user type,
and then select your product and version. You can
access hot topics, Knowledge Base articles, tutorials,
contact options, and more. You can also post a
question to an online Technical Support
representative.

■■ PriorityCare telephone support
This fee-based (in most areas) telephone support is
available to all registered customers. Find the phone
number for your product at the Service & Support
Web site. You'll be led through the online options
first, and then to the telephone contact options.

Support for old and discontinued versions

When Symantec announces that a product will no longer
be marketed or sold, telephone support is discontinued
60 days later. Technical information may still be
available through the Service & Support Web site at:
http://service.symantec.com

Subscription policy

If your Symantec product includes virus, firewall, or Web content protection, you may be entitled to receive updates via LiveUpdate. Subscription length varies by Symantec product.

After your initial subscription ends, you must renew it before you can update your virus, firewall, or Web content protection. Without these updates, you will be vulnerable to attacks.

When you run LiveUpdate near the end of your subscription period, you are prompted to subscribe for a nominal charge. Simply follow the instructions on the screen.

Worldwide service and support

Technical support and customer service solutions vary by country. For Symantec and International Partner locations outside of the United States, contact one of the service and support offices listed below, or connect to http://service.symantec.com and select your region under Global Service and Support.

Service and support offices

North America

Symantec Corporation   http://www.symantec.com/
555 International Way
Springfield, OR 97477
U.S.A.

Australia and New Zealand

Symantec Australia   http://www.symantec.com/region/reg_ap/
Level 2, 1 Julius Avenue   +61 (2) 8879-1000
North Ryde, NSW 2113   Fax: +61 (2) 8879-1001
Sydney
Australia

Europe, Middle East, and Africa

Symantec Authorized Service Center   http://www.symantec.com/region/reg_eu/
Postbus 1029   +353 (1) 811 8032
3600 BA Maarssen
The Netherlands

Latin America

Symantec Brasil   Portuguese:
Market Place Tower   http://www.service.symantec.com/br
Av. Dr. Chucri Zaidan, 920   Spanish:
12° andar   http://www.service.symantec.com/mx
São Paulo – SP   Brazil: +55 (11) 5189-6300
CEP: 04583-904   Mexico: +52 55 5322 3681 (Mexico DF)
Brasil, SA   01 800 711 8443 (Interior)
                                              Argentina: +54 (11) 5382-3802

Glossary

Active Directory The directory service that stores information about objects on a network and makes this information available to users and network administrators. Active Directory gives network users access to permitted resources anywhere on the network using a single logon process. It provides network administrators with an intuitive, hierarchical view of the network and a single point of administration for all network objects.

backup image An exact copy of a drive (either containing data or the operating system) that is usually compressed and stored as a file. A backup image file has a .v2i (Virtual Volume Image) file extension. Backup images are what you use to restore files and folders or an entire drive. A backup image is also sometimes known as an image, backup, or backup set. You can view the contents of a backup image file using Backup Image Browser.

bare metal recovery The complete recovery of a computer after a catastrophic hard disk failure. It includes the restoration of the operating system, file system, partitions, volumes, and data, from a complete backup image.

cluster The smallest allocation unit in the FAT, FAT32, and NTFS file systems. One cluster consists of a fixed number of disk sectors.

delayed apply   Restoring an operating system partition using the Restore Drive Wizard from the product's console (as opposed to using the System Restore Wizard from the recovery environment).

drive lock   A request by the software for exclusive use of a selected drive before making any modifications to the file system of the hard drive. By locking down a drive, you prevent other software programs from changing the file system while the product is trying to change it. This ensures that any data on the drive is current and accurate at the time of restoration.

extended partition   A special kind of primary partition that was developed to overcome the four- partition limit. The extended partition is a container inside of which you can create logical partitions. The extended partition itself does not hold any data, nor is it assigned a drive letter. But logical partitions inside the extended partition can hold applications and data and are assigned drive letters.

hot backup   A backup image taken in real-time without interrupting system operation on the computer.

hot restore   The restoration of a backup image while the computer remains up and running. You can perform hot restores of data or applications with the product. Performing a hot restore of an operating system partition is not available.

image   See *backup image.*

image set   If you use a base image and incrementals to back up a drive, the combination of the base image and incrementals is called an image set. When you restore to a given point in time, the base image and all the incrementals taken up to that point in time are used for the restore. It is important that all the files in an image set (the base image and all the incrementals) are in the same directory. If any piece is missing, the backup is invalid and you will not be able to restore the data.

incremental backup
Backup files that contain a snapshot of the sectors that have changed on a drive since the base backup or the last incremental backup was taken. Incremental backups are designated by the .iv2i file extension. Incremental backups are faster to create and require less drive space than full backups, so they are useful if you want to back up your drive more often without using a lot of time or drive space. When you restore a drive (or files and folders) to a point in time and you have used a base image with incremental backups, the base image *and* the incrementals up to that point in time are used for the restore. Therefore, incremental backups must be saved in the same directory as the base image (*.V2i). You should not delete incremental backups because doing so invalidates the whole backup image set.

.iv2i
An incremental backup image. Incremental backups work with a base backup image (a .v2i file) to provide restore capabilities to the point in time that the incremental backup was taken. For example, if you took a base backup image on Friday night and an incremental backup image on Wednesday morning, later you could restore files, folders, or an entire drive from the base and incremental backups. It is important that the base image (*.v2i) and all the incrementals (*.iv2i) are in the same directory. If any piece is missing, the backup is invalid and you will not be able to restore the data.

logical partition
a) A contiguous area inside an extended partition that can be used by the operating system to store and retrieve files. The operating system typically assigns a letter (for example, D:, E:) to the logical drive. b) Any partition, CD, or other storage device that contains a file system and is assigned a drive letter.

mount a volume
The ability to see and use a volume within a backup image that is physically located somewhere else on the network. The volume has a drive letter assigned to it, so it looks like it is a part of the local computer system. Though a mounted volume is read-only, you can open files and folders, scan for viruses, and even run some executables from within a mounted volume.

primary partition   A partition referenced in the master boot record (MBR) partition table. Only four primary partitions can exist on a hard disk. One of these may be an extended partition. Only one primary partition on a drive may be active at a time. When one primary partition is active, the other primary partitions are typically not accessible. Data and programs are often placed on a logical partition inside an extended partition. This enables the data to be accessed by all primary partitions.

protect drive   Protecting a drive means the drive is placed under the full-time protection of the agent. When you protect a drive, you are specifying a schedule for creating consistent backup images, the backup image storage location, and any backup storage options you want.

recovery environment   A graphical, secondary boot environment (or operating system) that gives you the minimal functionality needed to access backup image files on your network and restore them. This environment is typically used when a drive cannot be restored from within Windows or when the computer has suffered a catastrophic failure and you need to restore the entire hard drive. For more information on the recovery environment, see "How does the recovery environment work?" on page 81.

remote computer   A computer that is physically located somewhere else on a network but is accessible from a local computer.

service   A program, routine, or process that performs a specific system function to support other programs, particularly at a low (close to the hardware) level. The Norton Ghost agent is an example of a service.

.sv2i   An index file that is saved as part of a backup set to ensure that the base backup and the incremental backups are correctly associated with one another. The .sv2i file must be in the same directory as the .v2i and .iv2i files to ensure that backups can be restored.

Symantec Recovery Disk   See *recovery environment*.

UNC (Universal Naming Convention)
A method used to identify folders, files, and programs on a network computer. A UNC path begins with two backslashes \\ and is followed by the server name, the share name, and usually the directory and/or the filename. For example,
\\server_name\share_name\backup_name.v2i

.v2i
A backup image is saved with the .v2i extension. The .v2i file includes all the data (operating system, applications, data, and settings) needed to restore the drive to the state it was in when the backup was performed. Both full backups (used stand-alone) and baseline backups (used with incremental backups) must have a .v2i extension.

Index